INDIAN ARCHAEOLOGY

1982-83 — A REVIEW






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M.S. NAGARAJA RAO

Director General
Archaeological Survey of India

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PREFACE

This issue of 'Indian Archaeology — A Review' furnishes information on the Archaeological activities carried out during 1982-83 variously by the Archaeological Survey of India, Departments of Archaeology of States and other learned bodies. It highlights some fresh addition of important evidence on the regional Cultures of India which arc useful for the reconstruction of the past of the country. However, the responsibility of the accuracy of the information supplied rests with the contributors.

I thank K.N. Dikshit, the Director, besides, A. Marathe, Arundhati Banerjee, K.P. Padhy and S. Ganesh Rao of the Publication Branch who have assisted in various ways in the editing of the manuscript and S.R. Varma for seeing it published through the press.

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22 October, 1985.

M..S. NAGARAJA RAO

IN THIS ISSUE

Cover: Excavated remains at Hulas,
District Saharanpur (Uttar Pradesh)

EXPLORATIONS AND EXCAVATIONS

ANDHRAPRADESH

1. Exploration at Gallikonda, District Guntur.—D. Hanumantha Rao of the South-eastern Circle of the Archaeological Survey of India[1], during the course of his exploration located an extensive Medieval site near Vemagiri, a *bilam* (trough), 4 km south of Gallikonda village. The ancient remains at the site consisted of fortification walls built out of granite blocks, wells, tanks, temples and, loose sculptures. On stylistic grounds the structures can be assigned to the rulers of Palanadu, who ruled the area during the fourteenth-fifteenth century AD.

2. Excavation at Gandluru, District Guntur.—The Department of Ancient History and Archaeology, Nagarjuna University, under the direction of B.R. Subrahmanyam assisted by B. David Raju, excavated a Neolithic site at Gandluru in the Sattanapalli Taluk. The maximum thickness of occupational deposit was 90 cm and it was divided into three phases of Neolithic culture.

Phase I, was characterized by dwelling pits, four of which were encountered in the excavation. These pits were cut into calcrete and further down into schist in a subconical form and, circular or oval mouth. The sides expanding towards the bottom were evenly chiselled to make the floor. The pits were 1.05 m to 1.20 m deep, 1.1 m to 1.5 m at the mouth and, 1.7 m to 2.4 m at the bottom. The arrangement of post-holes suggested the plan of a wooden superstructure with an opening on the east. Occasionally, hand-made pots and sherds of buff, brown, and grey wares of a coarse fabric, cut animal bones, mostly of cattle, pieces of querns and mullers, a solitary ground stone-axe, and burnt clods of clay, were noticed inside the pits.

Phase II, here the Neolithic occupation was marked by the dwelling houses. The houses were oval or apsidal on plan with floors of lime-mixed-earth laid on soling of kankar nodules and stone fragments. The apsidal floor was 5.91 m long and 4.05 m wide. Each floor showed one or two clay-lined, basin-like- hearths. But none of the floors were marked by post-holes. The handmade pottery of earlier phase continued. A copper axe found on the surface of the site, perhaps belonged to this phase as during the excavation a piece of copper wire was also found. Several ground stone-axes, querns and pounders, and steatite disc-beads, were the other finds of this phase. Animal bones continued to occur in a large number. A pot-burial which was noticed below a house floor was without funerary objects.

Phase III, all the pottery fabrics of the preceding phase continued, but in addition, sherds

[1] The Archaeological Survey of India is referred to in the following pages as, the ‘Survey’.

of Megalithic black, and black-and-red ware also appear. No iron object was recovered in any of the excavated trenches. The houses were rectangular on plan and at least, two of the houses were of mud-brick walls. One of the houses had a wall of 4.15 m in length, joining another wall of 2 m in length at right angle.

3. Excavation at Vaddamanu, District Guntur.-The Birla Archaeological and Cultural Research Institute, Hyderabad, resumed (*1981-82 pp. 1-2*) excavations at Vaddamanu, under the direction of T.V.G. Sastri assisted by M. Kasturi Bai, M. Veerender and G.V. Ramkrishna Rao.

Excavation on the southern side of the mound yielded the remains of an open-air-gallery with a flight of steps in front of the stupa. A single course of brick wall, 15 m in length, below the lower step was also exposed. This formed the southern boundary of the portico in front of the stupa. The bricks which measured 47 x 31 x 8 cm were similar to the bricks of the stupa. The constructional details of the gallery and stupa were similar. The stupa and the lower levels of the gallery disclosed copper, and silver punch-marked coins, black-and-red ware pottery, and pieces of N.B.P. The arrangement of boulders in the construction of the stupa was similiar to that of the megalithic cairn circle, suggesting a primary stage in the evolution of stupa architecture in the Krishna valley. The gallery on the southern side could also be dated to second century BC. The structures and the cultural sequence corresponds to the period IB of Amaravati (*1973-74, p. 4*)

Excavation on the north-eastern slopes yielded an excellent flight of steps (pl. 1) indicating the main step-way to the hill top through the gorge. On either side of it vertical brick walls (parapet) were provided along the steps. The levelled-up patches of the slope were ingeniously used as platforms. The constructional details of steps were similar to that of Ikshvaku steps. The greenish marble slabs belonging to the rail fragments of earlier period Sometimes the brick walls were reinforced with stone revetment.

The main step-way consisting of 20 extant steps was built of bricks, and brick-bats. Three sizes of bricks were used in the construction, such as: 47 x 31 x 8 cm, 56 x 27 x 10 cm and 50 x 21 x 8 cm. It is evident that the later people have utilized the bricks of the earlier period.

The trenches, which exposed the main stair-way, have yielded Ikshvaku coins and fragments of dishes and bowls with inscriptions in Ikshvaku Brahmi (pl. 2 and 3)mentioning the names of donors. The inscription found on one of the sherds reads as 'Vadhama' indicating the ancient name of the village. This is still being continued.

The trenches along the eastern side of the main step-way showed the remains of exposed and disturbed cutstone revetment implying the occurrence of tectonic activity. In the lower levels underlying the wall of the main step-way a rectangular enclosure representing a balcony was excavated. The antiquities and the constructional details revealed that the balcony might have been built after the stupa but before the Ikshvaku occupation. The balconies could be attributed to the Satavahana period as-indicated by the brick size (56 x 27 x 10 cm) and the

[1] This publication is referred to in the following pages by the year only.

occurrence of the Satvahana coins.

The excavation on the northern side, below the floor level of the steps, showed super-imposition of structures. It was evident that the steps initially built were demolished and fresh steps were provided (pl. 1) to the west. The similarity in constructional details and the occu-rence of Ikshvaku coins from both the stages would suggest their contemporaneity.

4. Excavation at Ramapuram, District Kurnool.—In continuation of the last season's work (*1981-82,* pp. 3-8) the Excavation Branch (I) of the Archaeological Survey, Nagpur, under the direction of B. Narasimhaiah, assisted by B.P. Bopardikar, D.K. Arnbastha, K. Ismail, S.K. Mitra, S.D. Naskar and Mohinder Singh, S.V. Sutaone, P.M. Bhope, R.K. Dwivedi, Ramesh Kumar, R.K. Roy, M.U. Qureshi and A.U. Ganar, resumed excavations with the objective of exposing the area of occupation of Phases A and B, in addition to imparting field training to the students of the School of Archaeology of the Survey.

The excavation revealed that the people of Phase A had occupied an elevated south-eastern part of the site. The constructional method of the huts was the same as in the succeeding phases. The diameter of the circular huts was varying between 3.30 and 4.35 m. Some of the huts had the flooring and the outer periphery paved with stone slabs (pl. 4). The floors were found cut by pits yielding ash, potsherds and bone pieces. However, one of the pits turned out to be a vertical urn type burial of a child.

Three types of burial systems were observed in this phase such as: (i) vertical urn, (ii) horizontal single urn, and (iii) horizontal double-urn (kept mouth-to-mouth). Of these, the latter two types were found invariably outside the hut. Another interesting phenomenon noticed was that no burial furniture was found in any of the burials and not a single adult burial was encountered in the habitation belonging to this phase. The pottery encountered include burnished grey, red and black-painted red wares which occur even in the other two succeeding phases at the site.

In the northern part of the habitation, a 50 sq m area was conspicuous in yielding large number of finished and unfinished Mesolithic tools, flakes and cores alongwith a stone hammer, and a fabricator-like stone object, probably suggesting that the area was a tool-manufacturing place. However, the other habitational area, too, yielded microliths including blades, points, scrapers, lunates, flakes, and fluted cores of chalcedony, chert, quartz, jasper, etc. In addition, the stone tool repertoire is represented by pecked and ground stone tool industry having celts and mace-heads in trap and quartzite. Noteworthy antiquities are only a few pieces of copper wire and steatite disc-beads.

In Phase B, in addition to the settlement exposed in the earlier excavation, two more huts with diameter of 3.30 m and 4.03 m respectively were exposed. One of the huts had six pits measuring approximately 20 cm in diameter and 20 cm in depth, filled with ash of different colours. However, one of the pits yielded two celts and a small rectangular stone piece. The burial custom of these people is represented by two types; (i) urn burial — horizontal mouth-to-mouth, single vertical, single horizontal, vertical mouth-to-mouth, and horizontal-cum-inver-ted double-urn, and (ii) shallow pit-burial (pl.5).

The burials of this phase differ from the ones belonging to Phase C in some respects, such as: (i) there is no strict adherence to orientation; (ii) irrespective of the type of burial, whether urn or pit, the skull and other skeletal remains of a goat were invariabaly found along with human skeletal remains. The skull of the goat was kept over or near the human skull; (iii) the skull of the goat was kept either inside or outside the urn; (iv) mostly the mouth-to-mouth um burials contained the skeletal remains of children with their age varying between ten years and a few months, (v) in mouth-to-mouth urn-burial (pl.7) in a situation where the length of a skeleton was more than the two urns, the urn were arranged to cover the upper and lower portions of the skeleton, and the middle portion was left uncovered; or, as in some instances the urn on the side of legs was pierced through long bones to extend beyond the base of the urn; and (vi) among the urn-burial types, horizontally kept single urn and horizontal-cum-vertical double-urn were new sub-types encountered in this phase.

The shallow pit-burial type has oval pits of 10-15 cm deep, each containing at the bottom an extended burial of a child of 10-12 years. In some examples the skull of the child was given protection by keeping it either in a bowl (pl. 8) or in another larger skull. Interestingly, in one case a flexed skeleton of an unidentified animal (pl. 6) with its skull towards north and having a necklace made of as many as one thousand and five hundred small steatite disc beads around its neck was encountered. No metal objects were found associated with the burials of Phase B. However, the ritual of including the spouted vessels in the burial furniture was practised in this phase.

The pottery recovered is almost similar to the one from Phase C in having black, red, and grey wares, besides typical Chalcolithic black-and red-ware in addition to grey-and-brown ware were noticed earlier. However, noteworthy are the miniature perforated multiple lipped bowl and channel-spouted bowl in coarse red ware, a water pitcher in black ware and some small vases with pink/chocolate slip which seem to have been baked twice as grey ware vases show chocolate slip which peels off easily. Although hand-made pottery dominates, some wheel-made pottery is also encountered in this phase.

The antiquities recovered from this phase include copper objects such as parers, antimony rods, needles, coiled and barrel-shaped beads, twisted wire, rim portion of a small bowl, a lump and armlets; terracotta objects like discs, arecanut-shaped beads with large central perfo-rations, human figurines including male and female, animal figurines including dog, bull-heads, humped bull; two small pot-sherds ground to oval shape and one of them with painting; beads of steatite and carnelian; and bone objects including points, scrapers, etc. A huge bone probably a horn of a rhino or a tusk of an elephant is a remarkable find of the season. This bone was found kept in east-west direction along with some black-and-red ware sherds of chalcolithic fabric. Just below the bone a large jaw and a femur of an animal were also found in the same pit. Pecked and ground stone tool industry is also well represented.

This season's excavation confirmed that the cist burials were limited only to Phase C. The earliest of the cist burials was, however, found to have been sealed by the earliest occupational deposit of the phase. As if to claim the earliest date it carried some distinguishing features in having double capstones, north-west by south-east orientation, exclusive red ware vases as

burial furniture, two small iron objects, and a primary burial inside the cist.

Other interesting features noticed in some of the other cists opened during this season arc: (i) a unique type of pear-shaped red ware vase with sides tapering into rectangular base, so far not encountered in any other site in India; (ii) the slab pieces of cairn packing so well arranged (pl. 9) as to give an impression of masonry work and multiple coursed wall-like abutting of stone slabs around the cist; (iii) extended burial having pots inside as well as outside the cist (pl. 10, 11) and a large trough in black-and-red ware — again a unique find— on the southern side of a cist as burial furniture; and (iv) a cist with the southern slab taller than the usually taller northern slab and having as many as twenty-nine pots only on the western side of the cist, the pots being arranged in three tiers one above the other, and housing a neatly articulated skeleton and an iron object with pointed ends and two large central holes, probably share-end of a plough, kept to the east of the skull.

All the three phases have shown a large number of pits with diameters varying from 20 to 80 cm and they are interesting for yielding the following : (i) ill baked sherds of a vase; (ii) charred and uncharred animal bones, some of them having cut-marks; (iii) intact pots invariably kept inverted, sometimes kept in two or three tiers one upon the other, and in some cases the inverted vases yielding one or two bowls also kept inverted; (iv) terracotta animal figurines such as bulls, bull-heads, dog, etc. (The bull-heads appear to have been originally attached to the pots, but unfortunately no such pots or potsherds were found at the site); (v) some pits had upright stone slabs at the centre, but nothing associated with it; (vi) ash, loose soil, sometimes yielding traces of charred grains and grass seeds; (vii) steatite disc beads and terracotta spindlewhorl-like objects.

A large number of circular or oval platforms with diameter varying between 40 cm and 1 m were encountered inside and outside the houses in all the phases. However, their concentration was more in the western and north-western fringes of the habitation. Excavation of some of these revealed that first a circular or oval pit was dug to a depth of 10 to 35 cm which was then rammed with white sticky clay, sometimes mixed with small stones or slabs, extending upto 4-5 cm above the mouth of the pit, thus leaving a hard platform-like structure, presumably intended to be bases for the thatched bins. The absence of any grains nearby can be attributed to the calcareous nature of the soil.

This season's excavation revealed two more hearths/kilns in addition to the two noticed earlier. All were made up of burnt white clay and had plenty of ashes in them. One of these had a fuel chamber, a deep fire place with tripods. It also had a side oven connected by a small tapering hole. Thus, two pots could be simultaneously kept for cooking on this hearth-complex. The northern most hearth looked like an ant-hill with its numerous arch-like small compartments. All these compartments had ashes in them. This structure looked more like a furnace than a hearth or oven. However, neither metal nor any slag could be found.

However, the outstanding result of the excavation of this season is in exposing a probable pathway belonging to Phase A in the centre of the site running approximately 40 m north-south with a width varying between 3.60 m and 2.60 m, with a diversion at the centre running towards east, made of rammed *morrum,* pebbles and pieces of stone slab.

In this season, besides the habitation site, three more megalithic burials were taken up for excavation. All the three burials were cairn circles with pits having similar architectural features observed earlier. As usual, the burial furniture include bowls, dishes, vases and lids in black-and-red,black and red wares; and some iron objects such as chisels, knives, spear-heads, and a tanged dagger. However, none of the burials yielded any skeletal remains.

5. Exploration in District Krishna.—J.Varaprasada Rao of the South-eastern Circle of the Survey, conducted an exploration in district Krishna and brought to light the following sites.

Taluk	Village/Site	Cultural Assemblage
Jaggayyapeta	Buchavaram	Medieval
-do-	Budavada	Medieval
-do-	Chittela	Early Historic
-do-	Makkapeta	Medieval
-do-	Singavaram	Early Historic
-do-	Takkellapadu	Early Historic
Nandigama	Bramhabottapalem	Early Medieval
-do-	Gollamudi	Early Historic
-do-	Irrullapadu	Early Historic
-do-	Kollikulla	Neolithic, Early Historic
-do-	Kondapet	Neolithic, Early Historic
-do-	Kondrapadu	Early Medieval
-do-	Kunikinapadu	Neolithic, Early Historic
-do-	Lingagudem	Middle Palaeolithic
-do-	Medipalem	Medieval
-do-	Mundlapadu	Early Historic
-do-	Nandaluru	Early Historic
-do-	Pallagiri	Neolithic, Early Historic
-do-	Pochempalli	Medieval
-do-	Popura	Middle Palaeolithic
-do-	Punnavalli	Middle Palaeolithic, Early Historic
-do-	Ramapuram	Middle Palaeolithic, Early Historic
-do-	Saidapuram	Early Historic
-do-	Sanegapadu	Neolithic, Early Historic

Taluk	Village/Site	Cultural Assemblage
-do-	Satyavaram	Early Medieval
-do-	Subbayagudem	Early Historic
-do-	Veladi	Middle Palaeolithic
-do-	Venkatapuram	Medieval
-do-	Vibharetapadu	Lower Palaeolithic, Early Historic, Medieval
-do-	Vishavatapadu	Lower Palaeolithic, Middle Palaeolithic.

6. Exploration in District Mahbubnagar.— K. Ismail under the guidance of B.Nar-asimhaiah, Excavations Branch (1) of the Survey, Nagpur, carried out exploration in the District and brought to light the following sites:

Taluk	Village/Site	lat./long.		Cultural Assemblage
Atmakur	Nandimalla	16° 21’	N	Megalithic cairn circles
		77° 44’	E	
Jedcherla	Polkampalli	16° 38’	N	Mesolithic
		78° 02’	E	Megalithic cairn-circles with post-holed rectangular cists.
Kalvakurti	Donglagattu Tanda	16° 40’	N	Mesolithic rock-shelter with engravings
		78° 38’	E	Probably filled with ochre representing animals with slender body and curved horns.
Kalvakurti	Kalvakurti	16° 39’	N	Megalithic stone-circles
		78° 30’	E	Menhir and dolmen
-do-	Timmaipalli	16° 39’	N	Megalithic cairn-circles locally known
		78° 38’	E	as Doddigodalu (walls of pen); and a medieval temple
-do-	Urkonda	16° 43’	N	Megalithic cairn-with rectangular cists, a
		78° 24’	E	yielding neolithic celts and Satavahana structural remains, pottery including black-and-red, red and black-slipped wared; and a medieval temple
Mahbubnagar	Hasnapur	16° 41’	N	Mesolithic
		78°01’	E	
-do-	Koilkonda	16° 45’	N	Medieval fort
		77° 48’	E	
-do-	Mahbubnagar	16° 44’	N	Megalithic cairn-circles with east-west

Taluk	Village/Site	lat./long.		Cultural Assemblage
		77° 59'	E	orientation and rectangular cists
-do-	Tadikonda	16° 40'	N	Rock-shelter probably used as Mesolithic
		77° 59'	E	factory site by the Chalcolithic people and Megalithic cairn-circles with north-south orientation rectangular cists
Wanparti	Ghanpura	16° 36'	N	Medieval fort
		78° 04'	E	
-do-	Kandur	16° 32'	N	Megalithic stone-circles and cairn-circles
		78° 00'	E	with or without cists oriented north-south, and an early Historic habitation
-do-	Tirmalaipalli	16° 37'	N	Mesolithic, and Megalithic cairn-circles
		78° 04'	E	

7. **Exploration in District Mahbubnagar.—** In the course of his explorations S.V.P. Hala-katti of the South-eastern Circle of the Survey located the following sites:

Taluk	Village/Site	Cultural Assemblage
Godwal	Balgera	Middle Palaeolithic
-do-	Bijjiawaram	Megalithic
-do-	B. Timmapur	Late Medieval
-do-	Dasarapalle (Hamlet of Bijjiawaram)	Middle Palaeolithic, Megalithic
-do-	Dharur	Megalithic
-do-	Gonpad	Megalithic
-do-	Jadadoddi	Middle Palaeolithic
-do-	Jammichedu	Megalithic
-do-	Palava	Middle Palaeolithic
-do-	Puduru	Medieval
-do-	Purnapalem	Late Medieval
-do-	Sangala	Megalithic
-do-	Yeddulagudem	Middle Palaeolithic
-do-	Yelkur	Medieval
-do-	Kondapalli(Hamlet of Pudur)	Megalithic
-do-	Uppal	Medieval, Chalcolithic
Wanaparthi	Basawaipalle	Mesolithic, Late Medieval
-do-	Gummadam	Early Historical
-do-	Yaperla	Mesolithic.

8. **Excavation at Kudavelli, District Mahbubnagar**.— The South-eastern Circle of the Survey under the direction of I.K.Sharma, assisted by D. Hanumantha Rao, G.V.Srinivasa Rao, J.Varaprasada Rao, S.V.P.Halakatti and P.Sitarama Murthy, carried out a problem-oriented excavation at the Sangamesvara temple, Kudavelli, located at the confluence of the rivers Krishna and Tungabhadra, in Alampur Taluk.

The excavation was aimed at obtaining the foundation details of the massive temple, to link-up stratigraphically the earliest working level of the main unit with the brick structures uncovered by the Excavation Branch (I) of the Survey (*1978-79,* pp. 37-39), to study the layout of the *vastumandala* and to record the *garbhavinyasa* rites. These details were necessary for reconstructing the complex at a new site.

Two trenches were laid, one across the *garbha-griha* portion and the other across the *mandapa.* It helped to understand the plan of *garbha-griha* and *mandapa* at foundation level (Fig. 1). The former trench revealed that the ground occupying the temple complex was uniformly levelled and the first working level was found at a depth of 7.45 m which consisted of river borne silt and clay. Above this ground a platform consisting of compact brown earth (virtually ant-hill earth) alternated with roughly dressed *taki* stone slabs, was laid in a firmly packed manner. This feature is found only at the *garbha-griha* (Fig. 2).

Three phases of activities were recorded: Phase - I yielded fragments of red slipped and red-polished wares, small bricks measuring 5, 4 x 5 x 2 cm and a *bana-linga* in the earthen layers. Phase - II yielded similar pottery and brick-bats, and in phase - III an inscribed slab containing six letters "Agadikola Sri"in Chalukyan characters dateable to early sixth century AD was found.

In the second trench, the alternative layers of slab and brown earth were found only to a thickness of 3.90 m below the surface. The remaining part however, was packed with ordinary silt and clay from which no antiquities were found. Since, pillared *mahamandapa* was considerably of less weight, obviously the foundation make-up was of lesser thickness. Rectangular slabs containing game boards and in rare cases incised figures drawn in line identified as *daksha* and a deer were noteworthy finds.

9. **Excavation at Papanasi Group of Temples, District Mahbubnagar.—** The South-eastern Circle of the Survey under the direction of I.K.Sharma, assisted by D. Hanumantha Rao, G.V.Srinivasa Rao, S.V.P. Halakatti and J.Varaprasada Rao, carried out detailed examination and documentation of the group of temples at Papanasi, situated at a distance of 3 km south of Alampur. The group consists of twenty-three temples marked as A to W (Fig. 3)dateable to *circa* ninth to twelfth century AD.

The temple units were smaller and exhibit common elements such as raised platform of well-laid horizontal layers of *taki* stone slabs and alternate brown earth. These were found

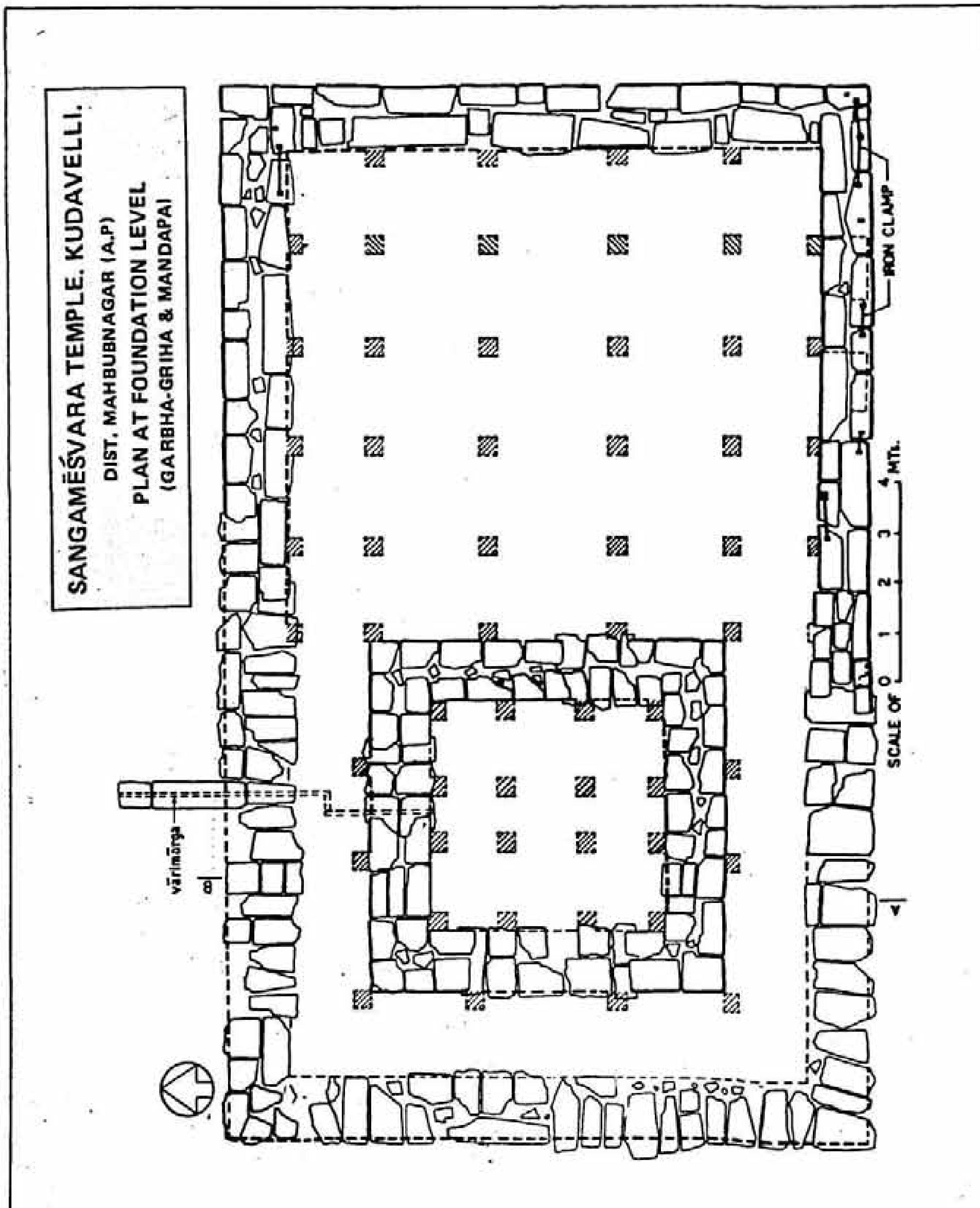


Fig. 1 : Kudavelli Dt. Mahbubnagar, Sangamesvara Temple: Plan at Foundation level (Garbha-griha and Mandapa).

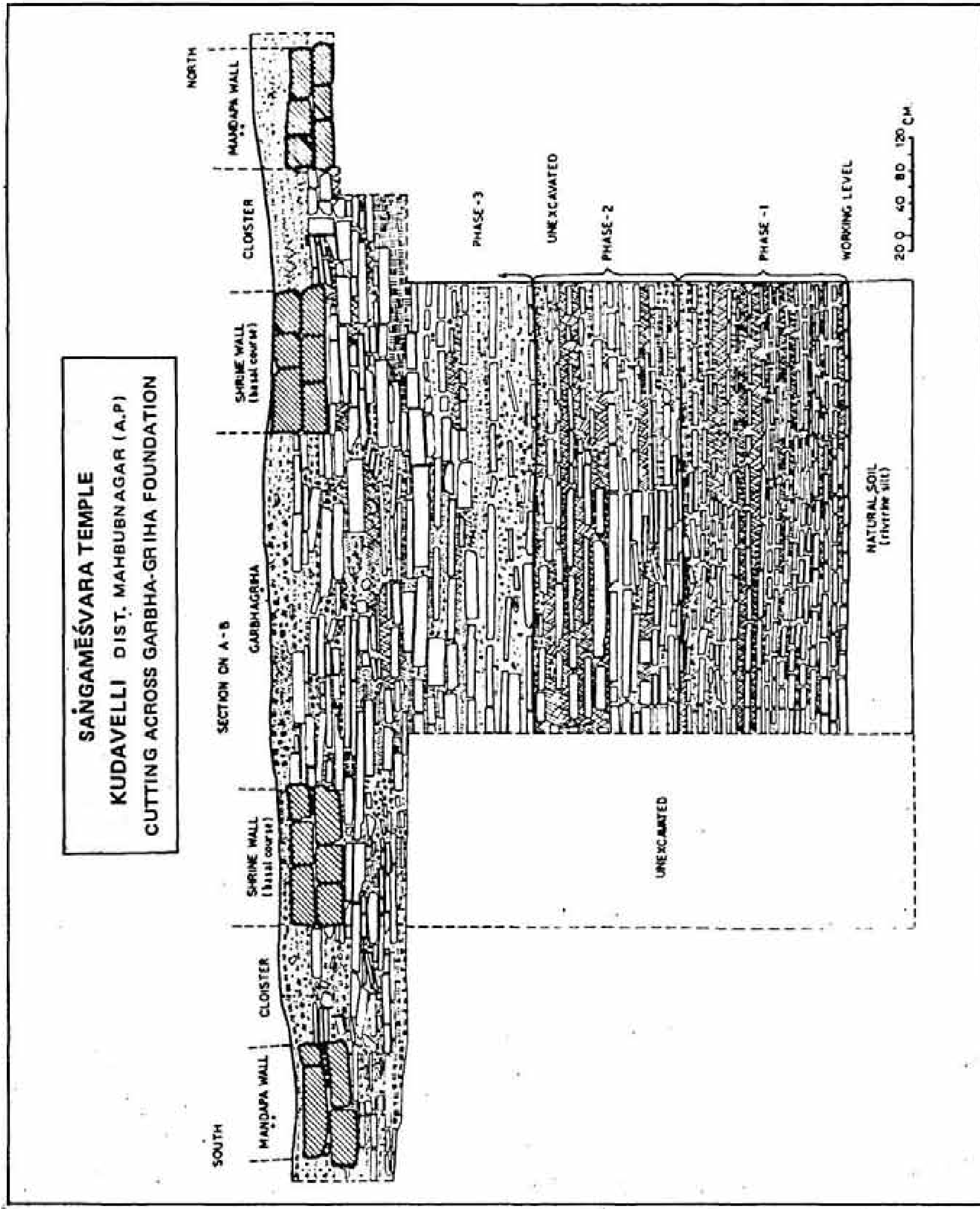


Fig. 2 : Kudavelli Dt. Mahbubnagar, Saṅgamesvara Temple: Cutting across garbha-griha Foundation (Section on A-B).

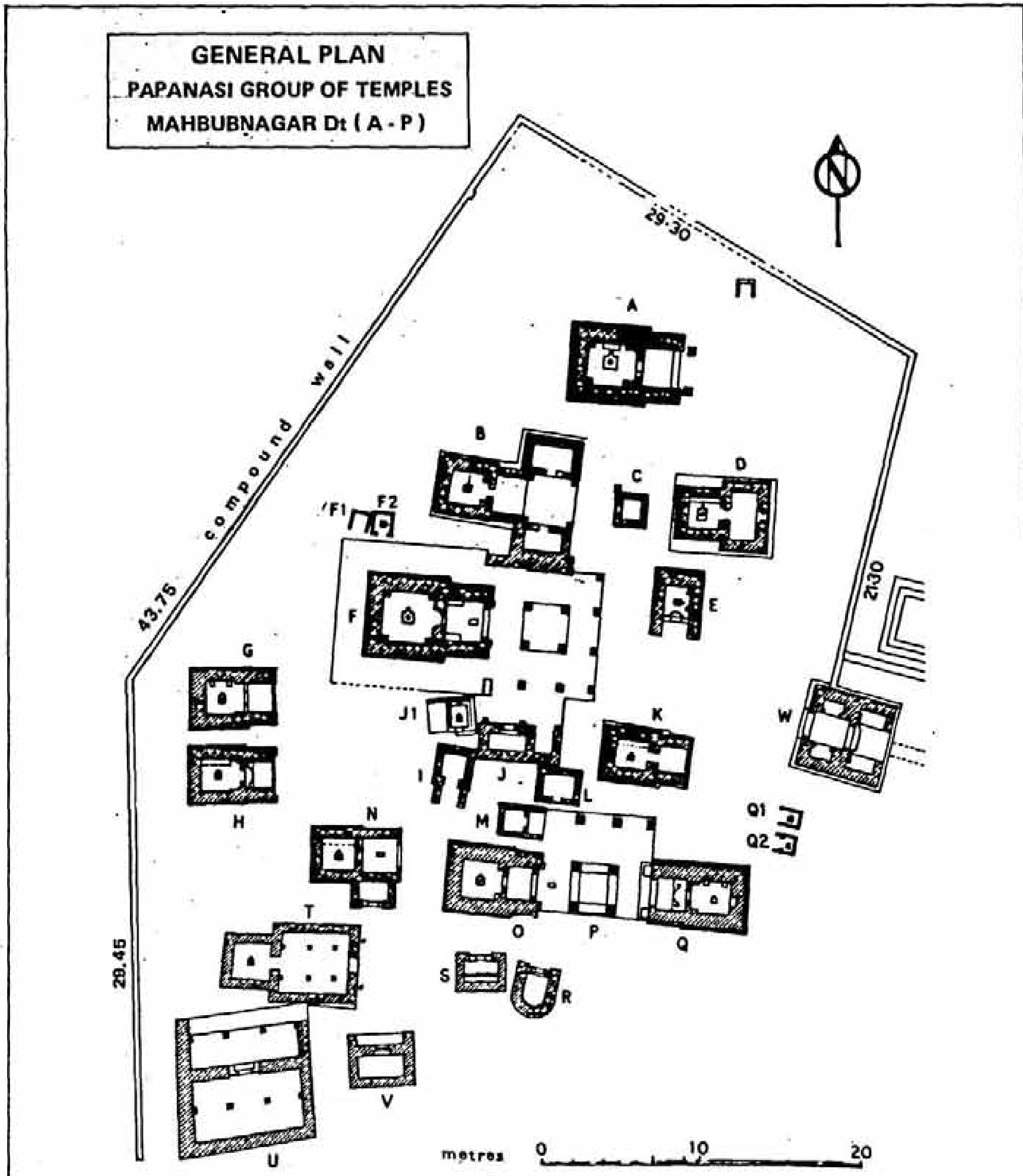


Fig. 3 : Papanasi : Dt. Mahbubnagar, Group of temples: General plan.

in most of the cases to a depth of approximately one metre below the *upana* layout. The ritualistic aspects like delimiting the area and fixing of the *vastutnandala* and the various elevational mouldings of the superstructure were marked by the *manasara* lines either in a dotted manner or incised over the base stones to make perfect plumb lines.

While dismantling the *sikharas,* it was noticed that decorated copper *kalasas* were found consecrated usually at the *griva* level within the inner core filling of the roof corresponding to the vertical *stupi* alignment overhead of the sikharas in temples marked B, C, E, F, H, K, T and V. These kalasas (Fig. 4), mostly spouted vases *(kamandalas)* with their spouts projected to the left and corresponding to the level of the rim were eight in number. The *kalasas* from temples B, H and T possessed lids, while in the remaining cases no lids were kept but tightly packed with blackish riverine silt. The objects placed in some of these vases were of great significance. The spouted *kalasa* from the temple B resembled an upraised trunk of an elephant; it was capped by a circular lid with serrated rim for tight closing and contained five precious stones wrapped in a thin gold foil and gold flower. These precious relics kept in the mid-region of the earth within the vase clearly suggested the observance of *ratnanyasa* ritual. While removing the *Lingapitha,* a leaf shaped gold foil and five corroded circular copper coins were also found. In an ornate-wide-mouth-spouted vase obtained from the Temple F, a quart-zite ovate flake symbolizing perhaps a human being was found and in another globular vase with a featureless rim from the Temple K an iron arrow-head was found placed with the cutting edge projecting upwards. From the floor level of the temple '0' a small iron mace was found adjacent to the side wall, while circular copper coins, six in number, were found from the soil below the floor of the *garbhagriha*; among these, one circular coin was noteworthy as its obverse had a trident within a square. A sharp knife with handle was found in the temple 'A'. The *kalasa* unearthed from the temples H and T have yielded lotus shaped cup bases made out of thin sheet of metal.

All the above objects together with the *kalasas* clearly suggest observance of various types of rituals during the construction of the temples as well as their final consecration at this sacred *tirthakshetra* during ninth-tenth centuries A.D.

10. Exploration in District Prakasam.— In the course of exploration P.Sita Rama Murthy of the South-eastern Circle of the Survey brought to light the following sites in Taluk Kandukur.

Village/Site	**Cultural Assemblage**
Baddaptidi	Early Historic
Bhimavaram	Medieval
Gundlapalem	Megalithic
Gurrapadiya	Late Medieval
Kanepalle	Early Medieval

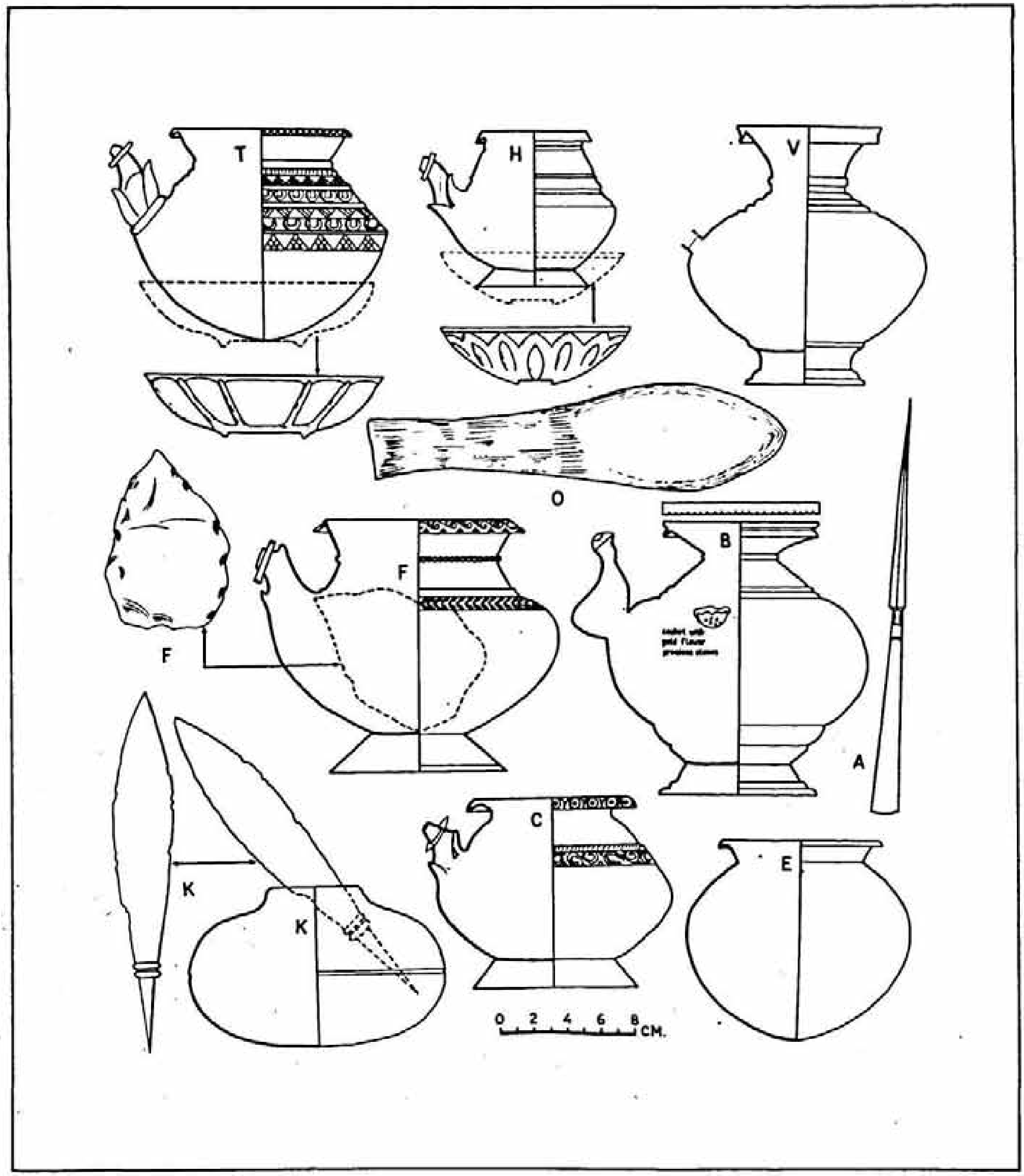


Fig. 4 : Papanasi : Dt. Mahbubnagar, Copper vases and minor antiquities from dismantled temples.

Village/Site	Cultural Assemblage
Mannctikota	Medieval
Narasingolu	Early Historic
Pakala	Late Medieval
Pattssava	Early Historic
Pentluru	Late Medieval
Singarayakonda	Late Medieval
Tangella	Late Medieval
Ulavapadu	Early Historic
Vikkiralapet	Medieval

ARUNACHAL PRADESH

11. Exploration in District Subansiri.— The Historical section of the Research Depart ment of the Government of Arunachal Pradesh carried out exploration at Parsi Parlo located in the lower part of this district and discovered a Neolithic settlement.

BIHAR

12. Excavation at Champa, District Bhagalpur.— The Department of Ancient Indian History and Archaeology, Patna University conducted excavation under the direction of B. Sahai assisted by B. Narayan, S.K.Kaviaraj, J.P.Singh and P.K.Bose. The main objective was to check the results of the earlier excavation (1978-79) pertaining to the pre N.B.P. phase.Two trenches each 6 x 4 m, were laid out towards the northern side of the Bishop's Office at Champa. The excavation revealed a sequence of three cultural periods.

Period I having a thickness of about 1 m was represented by layers (8a) and (8) which lay over the natural soil. It yielded a coarse variety of black-and-red ware, black ware and red ware. A semicircular object was also obtained.

Period II represented by four layers from (7) to (4) and 4.8 m in thickness revealed N.B.P. and its associated types. The structural remains included brick walls and a brick-well. The brick-well, 1.15 m in diameter, consisted of 63 courses of bricks. The brick walls were of maximum eight courses, antiquities included terracotta objects; such as plaques, cart-ram, wheel with spokes, bull figurines, perforated ball (pi. 12), a female torso, and animal figurines (pl. 13) of the typical Sunga style and a good number of iron implements and weapons, such as spear, dagger, knife, chisel, etc. (pl. 14) and a punch-marked coin, ornaments, and bangles of copper. Other antiquities included bone arrow head, point, ear ornaments and stylus; wheel, made of tortoise shell, and, stone beads.

Period III belonged to the post-N.B.P. phase. It was characterised by light brown earth mixed with brick-bats. Important finds included copper rod, copper bangle; terracotta conical objects, beads, and female figurine of the typical Kushan period; a few terracotta stampages (pl. 15) showing flower design and an inscribed terracotta sealing in late Gupta character. Other

antiquities included bone stylus and stone beads.

13. Exploration in District Bhagalpur.—In the course of his exploration K.P. Choudhary of the Mid-eastern Circle of the Survey noticed in Saidpur village a broken image of Lord Buddha in a temple known as Shivala.

14. Excavation at Taradih, District Gaya.—In continuation of the previous year's work (*1981-82*), pp. 10-12) Ajit Kumar Prasad of the Directorate of Archaeology and Museums, Government of Bihar, Patna assisted by N.C. Ghosh, S.S. Singh, Lakshaman Prasad Singh, Uma Shankar Pandit, Kedar Nath Singh, Sanjiv Ranjan, Jitcndra nath, Prabal Gupta, Vijay Kumar, Ashok Kumar Varma, Ram Swarup Singh and Abdul Kuddush Ansari under the guidance of Sita Ram Roy undertook excavations at Taradih mound, south-west of the famous Mahabodhi temple, Bodh Gaya. The excavation revealed five cultural periods.

Period I represented the Chalcolithic phase. The people lived in huts made of wattle and daub. The successive floors were made of rammed earth. Iron was not encountered whereas an axe of stone bearing Neolithic character was picked up from this site.

The pottery was hand-made and usually had a thick slip of various colours. Though the ceramics were dominated by the red ware specimens, but the specimens of black-and-red and black ware were also found in good number. The large pots were modelled by hand. The main pottery types included dish-on-stand, lipped bowl, bowl with globular profile and out-curved rim, ring based bowl, dish with in-curved or straight-sided rim, small vase, small to medium size jar with a sharp cairna at the neck and flared out rim and basin, etc. Some pottery pieces bore white paintings in the form of wavy lines, oblique strokes and dots.

Antiquities included were beads of terracotta, and of stone, arrow-head made of bone, and a small Neolithic celt.

Period II was marked by the appearance of iron along with the Northern Black Polished ware, grey ware, and black slipped ware. The black-and-red ware continued during this periojd but there was marked change in its fabric and types. Some red ware pieces bore black paintings of concentric circles on their interior profile. The important ceramic types included vase, *handi, rimless handi, lota* shaped vessel, basin, lipped bowl, lid-cum-bowl, etc. This period also yielded a few pieces of black slipped ware having graffiti marks. Amongst the structural remains post-holes, rammed floor, hearths and, a platform with a circular structure on the eastern side were also noticed.

The noteworthy antiquities of stone were bead, ball and bangle. The terracotta objects included bead, animal head, wheel, and a broken naga figurine. The bone objects included arrowhead, dice point, and stylus, ton slags and nails were also found alongwith a few pieces of crucibles.

Period III was represented by the ceramics of the Kushana period. Important antiquities included beads of terracotta and semi-precious stones.

Period IV was marked by the appearance of Gupta and late Gupta antiquities such as sealings, votive stupas, beads of semi-precious stones; bangles of terracotta, bone and glass, and

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1. Vaddamanu steps, VDM-II;



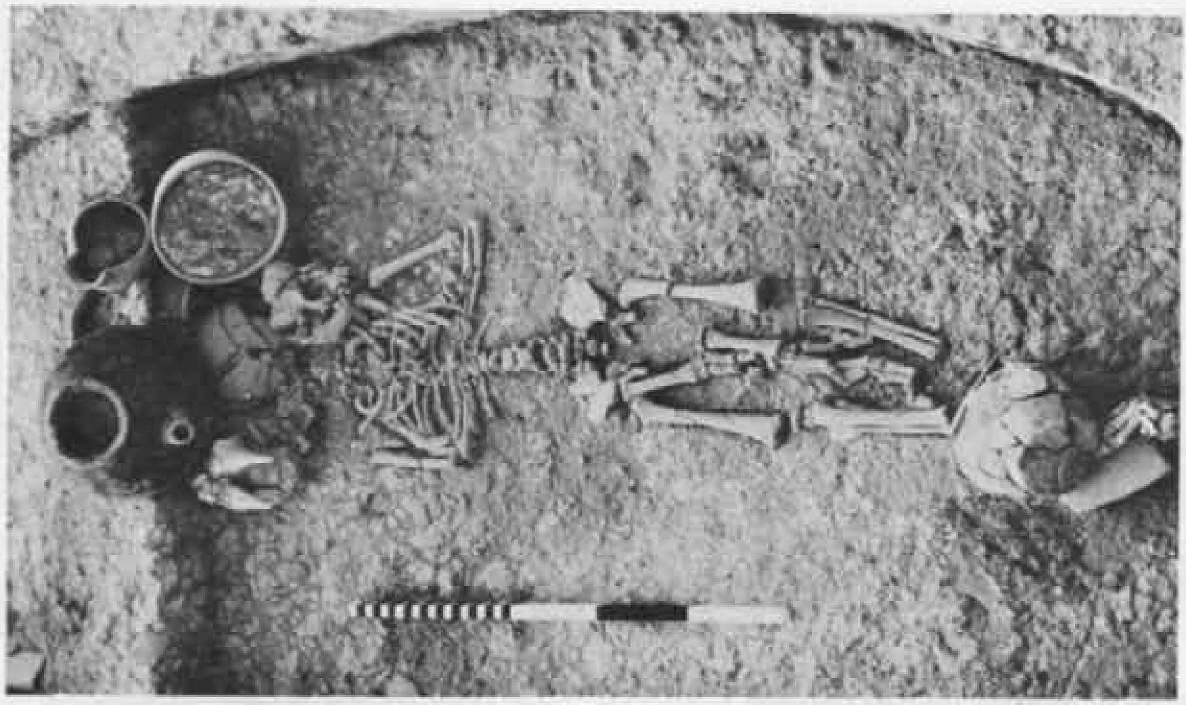
2. Vaddamanu inscribed sherds.



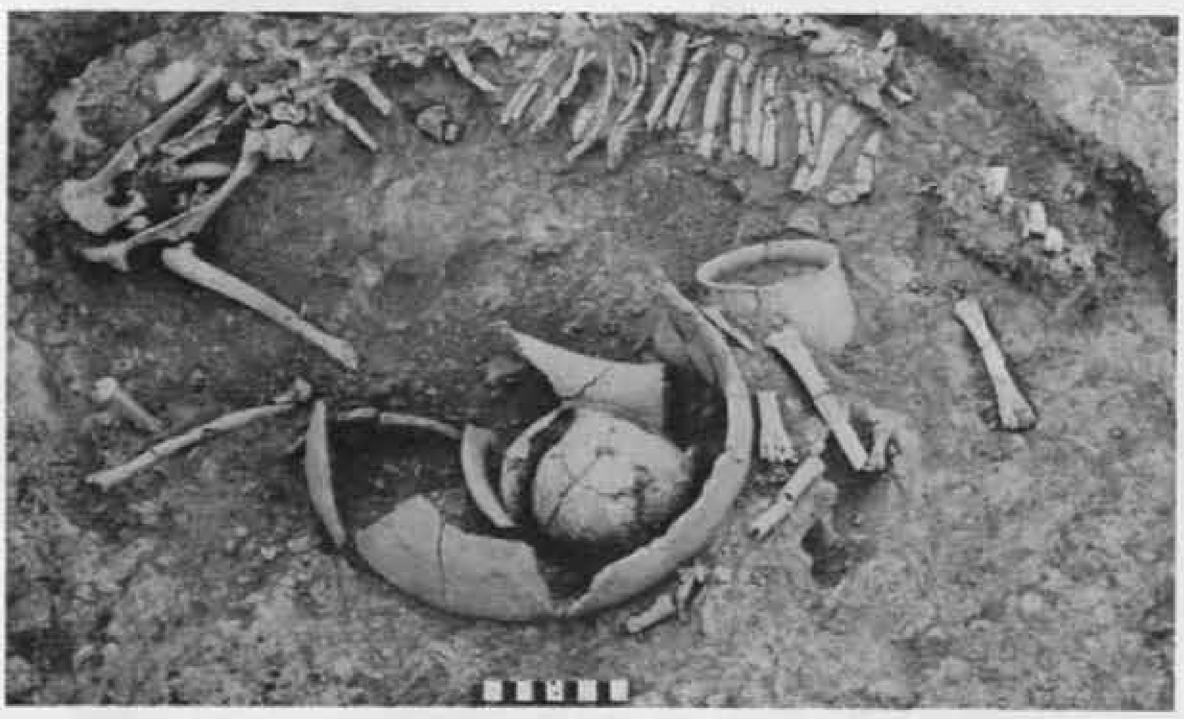
3. Vaddamanu inscribed sherds.



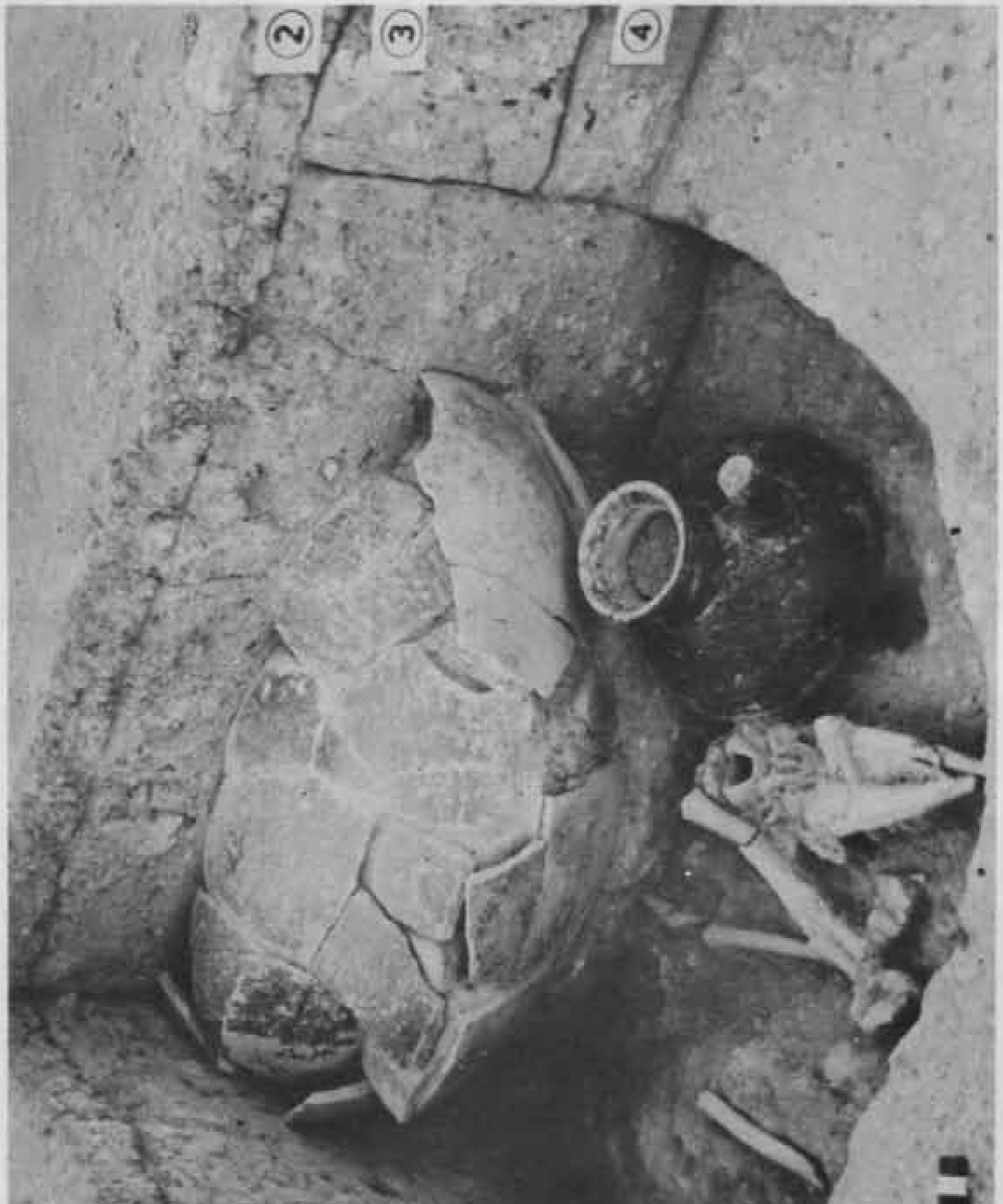
4. Ramapuram circular hut of Phase A;



5. Ramapuram shallow pit-burial of Phase B.



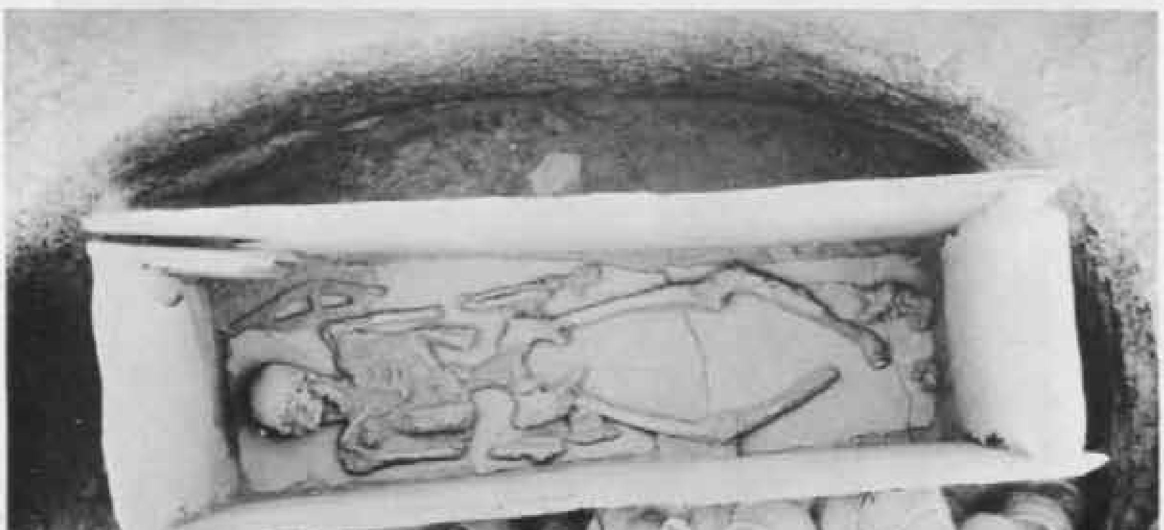
6. Ramapuram animal burial, Phase B;



7. Ramapuram vertical mouth-to-mouth Urn burial, Phase B.



8. Ramapuram child burial, Phase B;



9. Ramapuram cist with burial furniture Phase C



10. Ramapuram cist from the Phase C.



11. Ramapuram cist burial with abutting Phase C.



12. Champa terracotta objects of Period-II



13. Champa antiquities



14. Champa iron objects and pieces of iron ore.

an unfinished image of Vishnu.

Period V revealed the remains of a monastery with a prayer hall and side rooms of Pala period constructed out of reused bricks of earlier structures. Important finds are: a sealing which depicts Buddha in *Bhumisparsa mudra* and the Buddhist creed in contemporary script, small headless image of Surya and a terracotta plaque of Avalokitesvara in *lalitasana* pose.

15. Exploration in District Hazaribagh.—Sunil Kumar of the Mid-eastern Circle of the Survey noticed at Itkhori an ancient tank and remains of a temple assignable to the Pala period. Besides sculptures of Ganesa, Vishnu, Uma-Mahesa and Surya, ornamental pillars were found. An image of Tara with an inscription of Mahendra Paldeo is a noteworthy find. At Damduma he noticed remains of a temple including a few beautiful black stone images of *ashtabhuji* Durga seated on lion, upright standing figure of Surya wearing high boots with two attendants on either side, Vishnu standing on lotus, Ganesa seated on lotus and Siva linga within *arghapatta*dateable to Pala period.

16. Exploration in District Madhubani.— B. Nath of the Mid-eastern circle of the Survey in the course of exploration discovered a large mound in Kachhara village yielding red and Medieval glazed wares.

17. Excavation at Xalanda, District Nalanda.—In continuation of previous year's work (*1981-82* p. 12) the Mid-eastern Circle of the Survey, under the guidance of H.K. Narain assisted by B. Nath, Sunil Kumar and Indu Prakash, conducted excavation at Sarai mound to reveal partially exposed enclosure wall at the outer periphery of the main temple. The excavation yielded the remains of a monastic complex consisting of an enclosure-wall running east-west (15 x 80 cms). The extant remains were represented by 32 courses at the maximum height (brick size: 30 x 23 x 5 cms). Remains of a votive stupa including floors and ovens were also exposed in the south-west of the said wall. The most remarkable discovery was a ring well (1 m in diameter) exposed upto the depth of 5 meters. The rings were decorated with incised, floral, and geometrical designs.

Finds included a broken image of Surya, *dhyani* Buddha panels; terracotta sealings, one of which having the image of Garuda stamped over it; male and female figurines with elaborate head dress; terracotta stone beads, bangle pieces, copper slag and disc. A few stray Northern Black Polished sherds with golden and silvery shades were also found.

18. Excavation at Apsadh, District Nawadah.—In continuation of the last season's work (*1981-82,* p. 12) Prakash Charan Prasad, assisted by Tamil Akhtar and Raghunath Prasad Verma, of the Directorate of Archaeology & Museums, Government of Bihar, under the general supervision of Sita Ram Roy, resumed small scale excavation on the southern slope of the mound with a view to ascertain the extent of the lower most *pradakashina patha* of the temple, built in five different diminishing tiers. The excavations revealed that it was provided with a simple brick paved floor which continued on the southern side of the temple. The

bricks were of different dimensions such as, 35 x 23 x 4, 36 x 24 x 4 and 38 x 25 x 4 cms. An offset inner wall of the lower most *pradakshina-patha* was running east-west and showing 27 to 38 brick courses.

The excavation revealed the foundation-plan of the temple, whose main shrine was projected at about 15 metres high from the ground level; it had its foundation at the bottom of the structure which naturally formed chambers under the diminishing platforms of the *pradakshina-patha.* The chambers were filled up with silt and clay and brick soling in tier system. The filling process was undertaken in such a way that it could balance the load of the temple.

The pottery consisted of red ware with coarse to medium fabric. Typical forms were bowl, handle of the vessels, lamps and miniature pots. Noteworthy antiquities included two stone figurines of Surya and the other of Vishnu on *garuda.*

19. Exploration in District Palamau.— Ajit Kumar Prasad, of the Directorate of Archaeology and Museums, Government of Bihar, Patna, assisted by Lakshaman Prasad Singh, Uma Shankar Pandit, Kedar Nath Singh, Narayan Chandra Ghosh, under the guidance of Sita Ram Roy, carried out explorations in the District Palamau. In the course of exploration a site Hatigara, 15 km south-west of Japla yielded microliths, a Neolithic celt, hammer, pestle and a few pieces of gritty red ware. The above complex can be noticed, from Bhulubara, 17 km south-east of Japla.

20. Exploration in District Samastipur.— In the course of his exploration B. Nath of the Mid-eastern Circle of the Survey, discovered a large mound in Mangalgarh village yielding Northern Black Polished ware along with grey and black wares and a few terracotta figurines.

21. Exploration in District Saran.— Indu Prakash of the Mid-eastern Circle of the Survey, in course of his exploration discovejed the ruins of a brick temple in Dumariagarh village. He also noticed a large mound in Khanpur village yielding red ware, images of Vishnu and Siva and two panels having beautiful female figures belonging to the Pala period.

GUJARAT

22. Exploration in Districts Banaskantha, Kutch, Mahesana, Rajkot, Surendranagar and Vadodara.-The Department of Archaeology, Government of Gujarat, in the course of their explorations, located the following sites of archaeological interest.

District	Taluk	Village/Site	Cultural Assemblage
Banaskantha	Disa	Bodal	Medieval

District	Taluk	Village/Site	Cultural Assemblage
-do-	-do-	Chhatrala	-do-
-do-	-do-	Viruvada	-do-
Kutch	Nakhtrana	Paliwad	-do-
Mahesana	Kalol	Akata	Harappan
-do-	-do-	Ali-Udepur	Early Historic
-do-	-do-	Chavand	Early Historic
-do-	-do-	Dantali	Mesoithic
-do-	Kadi	Daran	Medieval
-do-	Kalol	Karkolia	Early Historic
Mahesana	Kalol	Keriya	Harappan
-do-	-do-	Krishnagadh	Early Historic
-do-	-do-	Lathi	-do-
-do-	Kadi	Nani Kadi	Medieval
-do-	Kalol	Nasmed	Mesolithic
-do-	-do-	Saladi	Harappan
-do-	-do-	Sedhavadar	Early Histeric
Rajkot	Padadhari	Dhrufaniya	Post-Harappan and
-do-	-do-	Dhunagam	Early Historic
-do-	-do-	Pipalwa	-do-
Surendranagar	Chotila	Moti-Moldi	Early Historic
-do-	-do-	Nani-Moldi	-do-
Vadodara	Chhota-Udepur	Morangana	Mesolithic.

23. Exploration in District Kutch.— Malti Nagar of the Deccan College Post-graduate and Research Institute, Pune, carried out explorations with an ethno-archaeological point of view.

Mandvi, Gundiyali, Lodhai and Sumrasar villages are major pottery making centres. The pots are painted in red and white colours over a light red background. A number of the designs on the pots are similar to the designs on Harappan pottery and suggest the persistence of an ancient tradition. Pottery from these places is exported to Jamnagar, Porbandar and other coastal settlements of Saurashtra by Kharwa (sailors), and Lavana (traders) communities. Until recently, the pottery used to be transported in boats across the Gulf of Kutch, but nowadays it is sent by trucks. Such long distance trade in pottery perhaps helps to explain the uniformity of pottery forms and technology over vast areas during the Harappan period.

Another interesting aspect of folk craft is the making of clay storage bins (*Kothi* or *Kothla*) by Rabaris (a pastoral community) in Bhujodi and Sumrasar villages. The bin itself serves as a refrigerator and is also provided with four legs to keep the bottom above the ground. It is interesting that similar bins have been found at the chalcolithic site of Inamgaon.

Larger bins with flat bottoms arc made for storing grains as well clothes, and other valuables.

24. Exploration in Districts Mahesana and Surcndranagar.— K.T.M. Hcgdc, V.II. Sona-wane and K.N. Momin, of the Department of Archaeology and Ancient History of the M.S. University of Baroda, carried out explorations in the fertile Lower Rupcn River valley, (71° 30-72° 00 E and 23°15 - 24°00 N) with a view to (a) ascertaining the extension and pattern of the immigrant Harappan relationship with the indigenous Mesolithic communities. This work was an extension of the exploration carried out in the adjoining area in 1978 *(1978-79,* pp. 6-7). The team discovered ten Mesolithic sites, twenty-one rural settlements of the Harappan Culture, and fourteen Medieval sites.

District	Taluk	Village/Site	Cultural Assemblage
Mahesana	Chanasma	Belmal	Medieval
-do-	-do-	Kamboi	Medieval
-do-	Harij	Paloli	Medieval
-do-	-do-	Sarval	Harappan and Medieval
-do-	Sami	Balera	Harappan
-do-	-do-	Jesada	Mesolithic
-do-	-do-	Khijariyali	Medieval
-do-	-do-	Kuwarad	Harappan
-do-	-do-	Man Verpura	Harappan
-do-	-do-	Panchasar	Harappan and Mesolithic
-do-	-do-	Runi	Medieval
-do-	-do-	Sonur	Harappan
-do-	-do-	Vaghel	Harappan and Medieval
Surendranagar	Dasada	Eravada	Mesolithic and Harappan
-do-	-do-	Panva	Mesolithic and Medieval.

25. Excavation at Rojdi, District Rajkot.— The Department of Archaeology, Government of Gujarat, carried out excavations at Rojdi, a Harappan site, with a view to under standing the Historic and the Harappan. The vessels from the early historic layers were with a flaring and beaded rim with grooves. They were of fine to coarse fabric and of various shapes.

The Harappan levels consisted of well-fired red ware and grey ware. The various shapes were convex sided bowls, stud handled bowls, dishes, dish-on-stand and jars. Other interesting antiquities were beads, shell bangles, spindle whorls,.and terracotta ear-stud.

26. Exploration in Districts Sabarkantha and Vadodara.— Narayan Vyas of the Western

Circle of the Survey during the course of his exploration discovered the following sites:

District	Taluk/Tehsil	Village/Site	Cultural Assemblage
Sabarkantha	Himmatnagar	Raisinghpura	Black-and-red ware and red ware
Vadodara	Vaghodia	Antoli	Medieval sculptures
-do-	-do-	Jhaverpura	Early Stone Age, tools, microliths, brick structure, iron slag, early Medieval temple and sculptures
-do-	-do-	Nai Nagari	Ancient tank, brick structures and early Medieval sculptures
-do-	-do-	Patia	Medieval sculptures
-do-	-do-	Vejalpur	Microliths, brick structures, of early Medieval temple and sculptures.

27. Exploration in District Surat.— In the course of exploration, S.S. Nayak of the Western Circle of the Survey, brought to light the following sites:

District	Taluk	Village/Site	Cultural Assemblage
Surat	Mandvi	Areth	Step-well of sixteenth-seventeenth century
-do-	-do-	Balethi	Microliths, historical site with black and red wares
-do-	-do-	Bodhan	Siva temple with sculptures and an inscription
-do-	-do-	Deogarh	Early and late Medieval site with brick structures and bronze image
-do-	-do-	Kamalpur	British rest-house dated to AD 1873
-do-	-do-	Khanjroli	Mound with black-and-red ware,

District	Taluk	Village/Site	Cultural Assemblage
			brick structures, Medieval Brah-manical sculptures
-do-	-do-	Kosadi	Inscribed fragmentary sculpture of thirteenth-fourteenth century
-do-	-do-	Kulkhari	Late Medieval site
-do-	-do-	Ladkuva	Mound with Medieval pottery
-do-	-do-	Luharwad	Microliths and early Medieval site
-do-	-do-	Maldha	Late Medieval pottery
-do-	-do-	Mandvi	Medieval site, brick masonry fort, temples of fifteenth-six-teenth century
	-do-	Moritha	Medieval site
	-do-	Patna	Early historical site with red-polished, red-and-black wares, terracotta object and Medieval Brahmanical sculptures
	-do-	Pipalwada	Early historic and Medieval site
	-do-	Piparia	Medieval site
	-do-	Rajwada	Early Medieval Brahmanical sculptures
	-do-	Umarsadi	Early historical and early Medie-val site
	-do-	Un	Late Medieval site
	-do-	Wankla	Microliths
	-do-	Wareth	Microliths
	-do-	Waroli	Medieval site
	Nizar	Antaruli	Early Medieval site
	-do-	Ashrava	Medieval site
	-do-	Hathoda	Three temples of Maratha period
	-do-	Hingani-Digar	Brick fort, chhatri and paint-ings of Maratha period
	-do-	Kukarmunde	Ruined brick fort, small Brah-manical shrines and memorial stones
	-do-	Mubarakpur	Two step-wells
	-do-	Pishavar	Step-well of circa sixteenth century
	-do-	Sajjipur	Early Medieval site

District	Taluk	Village/Site	Cultural Assemblage
	-do-	Sulvada	Early Medieval site and huge Siva-linga
	-do-	Ubhad	Microliths & Chalcolithic site
	-do-	Vyaval	Early historical site.

28. Excavation at Goraj, District Vadodara.— On the basis of the information received about sculptures lying in and around the village Goraj, B.M. Pande of the Western Circle of the Survey and U.P. Shah formerly of the Oriental Institute Baroda located the site of Mahade - opura, in Goraj village. The trial excavations were conducted under the direction of B.M. Pande, assisted by R.D. Singh, T.S. Murthy, Narayan Vyas, K. Veerabhadra Rao, N.A. Saiyed, M.D. Puranik, A.R. Shah and S. Sarangadharan. A trench measuring 10 x 10 m was laid on the western slope of the mound behind the Siva temple.

During the course of excavations the plinth of a large brick-built structure was exposed (pl. 16). The projections of the plinth, of which as many as twenty-nine courses was exposed, was found oriented north-south and east-west. The mouldings of the plinths comprised of *kumbha* and *skandha,* etc.

The sizes of bricks used in the construction of the structure were 44 x 25 x 37 cm, 41 x 26 x 17 cm, 41 x 27 x 36 cm, and 43 x 26 x 37 cm.

The limited number of potsherds found in the trial dig were of plain and micaceous red, grey and red-slipped wares while the only objects found were an iron nail reminiscent of similar iron nails found at Deynimori, a circular bead of crystal and a piece of lead.

On the analogy of the excavated remains at Kayavarohan and Devnimori the partially exposed brick structure may be dated between third and fifth centuries AD.

JAMMU AND KASHMIR

29. Exploration in District Jammu.— In the course of exploration in Upper Siwaliks (Pinjor Formation) of the Jammu area, G. L. Badam and R.K. Ganjoo of the Deccan College Post-graduate and Research Institute, Pune has brought to light following fossils of: -

Probqscidea — *Stegodon insignis ganesa, Stegolophodon* sp., *Elephas* sp. ; Ungulates —
Equus sp., *Bos* sp., *Giraffa* sp., *Hippopotamus* sp. and
Reptiles — *Trionyx* sp, (turtle) , *Crocodylus* sp.

The sites visited were covering the fossiliferous pockets located at Parakara, Kivli, Rajouli and Nagrota (about 20 km NW of Jammu) including the fossiliferous pockets at Khanpur. The faunal assemblage indicated a savannah type of environment during the deposition of the Upper Siwalik sediments around Jammu.

KARNATAKA

30. Excavation at Hampi, District Bellary.— In continuation of the last year's work (*1981-82,* pp. 25-26), M.S. Nagaraj Rao, assisted by C.S. Patil and Balasubrahmanya of the Directorate of Archaeology and Museums, Government of Karnataka and the Mid-southern Circle of the Survey resumed the excavation at Hampi (Vijayanagar).

Excavations at the Nobleman's Quarters in the Royal residential area of the city of Vijayanagara, had brought to light two palaces named as Nobleman's Palace 1 and Nobleman's Palace 2.

The north facing Nobleman's Palace 1 (pl. 17) was surrounded by two enclosure walls consisting of a main structure, two pillared halls—one on east and another on west, a well and a water cistern. The main structure was on double basement of well-dressed granite courses and the interior divided into three levels each defined by a decorated basement, one rising over the other, the topmost being at the south end. The third basement was decorated with a panel of girls dancing with sticks. These levels were entered by a flight of steps with *yali* balustrades. The two lower levels consisted of halls and verandhas and the topmost level with four rooms—one in the centre surrounded by one room each on east, south and west sides with .a passage on all the sides of the central room. In the south eastern corner was a bath-room.

Nobleman's Palace 2 consisted of a main structure surrounded by a passage, a low corridor, a series of rooms on south, west and north sides, all situated in an enclosure wall. The palace was facing north. The main structure stands on a double basement and the interior was divided into four levels each defined by a basement and entered by a flight of steps with *yali* balustrades. The basement consisted of well-dressed mouldings. The three lower levels had courts and the topmost with a room in the centre and a passage on the three sides.

The rooms of the cloister were constructed on moulded basement and entered by a flight of steps. There were two drains running for removing out water from the passage surrounding the main structure.

The floors at both the palaces were of lime concrete and plastered with mud and lime. The enclosure walls were made of blocks of stones and pillars and beams were made of wood. Several iron nails, clamps, copper coins, Chinese porcelain and earthen pottery pieces were found in the excavations.

Excavation of the Nobleman's Palace 1 is complete and that of the Nobleman's Palace 2 is in progress. In order to expose the original road and the basements, excavation was undertaken at the Virupaksha Bazar (pl. 18) in front of the Virupaksha temple. This revealed a row of *mandapas* (pl. 19) on a basement on each side. The length of the road excavated so far is 173 metres. The basement of these *mandapas* were buried and the original road was covered with

debris having a thickness of 1.75 metres. The excavation had brought to light the basement of the central *utsave mandapa,* northern *mandapa* and the southern *mandapa,* and the original road with stone pavement in the centre.

The temple of Nagareshwara which was buried upto the roof level, was cleared completely exposing the original floor inside the temple and the pavement on the exterior.

The Krishna temple lying on the road from the Hazara Rama temple to the Talari-ghat, was cleared exposing its basement.

31. Excavation at Hampi, District Bellary.— In continuation of the previous year's work (*1981-82,* pp. 25-26) the Mid-southern Circle of the Survey, under the direction of L.K. Srinivasan, assisted by B.S. Nayal, K.P. Poonacha, L.C. Singh, V.S. Sarma, C.L.N. Sastry, V. Kumar, M. Loganathan, B. Unnithan, J. Ranganath and C. Prakash, resumed excavations under the National Project at Hampi in the area to the south of the king's Audience Hall with the objectives of (i) exposing the remaining portions of the vast structural complex encountered during the previous season's work and (ii) tracing the plan of the citadel complex.

The excavation brought to light a vast residential complex hereinafter called STR-1. Other structures exposed further south of STR-1, during the current season include pillared platforms (STR-2 and STR-3), small tanks (T-l and T-2) and a lime floored big passage in between.

STR-1, oriented north-south, rectangular on plan, measuring 32.80 m (north-south) x 41 m (east-west), was built in two phases. The early phase was represented by a couple of pillar bases encountered below the plastered floor of the succeeding phase; confirming the evidence noticed in the structures to the north of STR-1 in the earlier season's work. The plinth of this structure extended to a maximum height of 0.98 m and was veneered with two plain and two decorated ashlar masonary courses in granite, which were arranged one above the other alternately. The second and the fourth courses from the bottom were decorated with semi-arch motif, projecting at a regular interval of 60 cm.

The plinth was pierced with two entrances each from the northern and southern sides having an average width of 2.97 m with two landings. Some moulded course in black stone provided over the plinth on the eastern side indicated the existence of a big entrance from each which obviously appeared to be a later addition.

In the second phase, this rectangular platform was converted into a closed structure with granite rubble walls constructed in mud mortar and plastered with mud and lime. Six rooms of varying dimensions enclosed the huge central hall approached from all the rooms except the one in west. The central hall was rectangular on plan and measured 12.80 m (north-south) x 7.17 m (east-west). The walls of the southern half of this room were much disturbed. Three distinct layers of lime floor varying in thickness from 3 mm to 1 cm, were observed. The room to the north-west was also rectangular on plan 7.46 m (north-south) x 9.97 m (east-west). It accommodated a square bath (2.65 x 2.65 m) with lime concrete floor enclosed by a brick wall constructed in lime mortar on three sides extending to a maximum height of 22 cm and having a water outlet cut on the top most course of the plinth. Another rectangular room 7.32 m

(north-south) x 12.18 m (east-west) to the north of the central hall had patches of lime floor. An entrance leading to the central hall from the southern side connected this room.

The large rectangular room to the east of the central hall measured 29.50 m (north-south) x 2.75 m (east-west). This room housed a lime plastered rectangular brick structure of a later date measuring 3 m (north-south) x 2.75 m (east-west), erected over the lime floor of the hall. Bricks used here measured 21 x 11x 3 cm. The dressed rectangular granite blocks kept one above the other at a higher level on the north-western corner of this room may be the remnants of an entrance which might have served as a screen wall for the passage leading to the room. Of the two rooms exposed to the south of the central hall, the one to the cast was rectangular on plan 7.34 m (north-south) x 3.94 m (east-west) and the other to the west was square on plan (7.25 m x 7.25 m), and they were separated by a screen wall.

The fact that this was a unique residential complex in the whole of the citadel area and its close proximity to the king's Audience Hall indicated that this building might have been used by the king for private audience. This was further corroborated by the fact that the structures to the north of this complex upto the southern entrance of the king's Audience Hall were all interconnected. The granite rubble wall constructed for partitioning the rooms in the complex extend upto a maximum height of 0.60 m and vary in thickness from 0.60 m to 0.90 m. This wall constructed in mud mortar had both on the exterior and the interior, a 5 to 7 cm thick mud plaster with two or three layers of lime plaster, the thickness of which varied from 2 mm to 6 mm.

STR-2, also oriented north-south, was situated 5.60 m to the south-east of STR-1. It was a pillared platform, rectangular on plan measuring 14.25 m north-south x 19.06 m east-west, with square pillar bases on its top with a 2.90 m wide entrance from the north. The maximum height of the plinth available was 35 cm and it consisted of two courses of dressed ashlar masonry in granite. The plain bedding course, (20 cm in height) accommodated a decorated course (15 cm in height) with projecting semiarch motifs provided at a regular interval of 0.60 m. The upper courses, however, were missing. The square pillar bases measuring on an average 60 x 60 x 18 cms were laid on the east-west axis to form seven bays, each having an average width of 2 m.

Abutting STR-2 at the north-eastern corner was a small tank (T-l) square on plan (1.80 m x 1.80 m and 1.50 m depth). It was dug into the granitie bed-rock and was veneered internally from top to bottom with rectangular granite blocks and further covered by layers of lime plaster varying in thickness from 3 mm to 5 mm including the floor. It was provided with a flight of steps each measuring 0.42 m in width. Besides the usual coping stone, at the upper portion on all the four sides except near the entrance, was a vertical course of dressed granite slabs serving as a parapet. This tank was slightly oriented towards north-west.

Excavations to the south-west of STR-1 at a distance of 6.5 m and 15 m to the west of STR-2 have brought to light the remnants of another rectangular platform (STR-3) at a level lower than that of STR-1 and STR-2. With a north-east and south-west orientation, this structure was extant only upto the plinth portion which was intact in the south-eastern corner and dislodged in the remaining portions. The intact portion of the plinth measuring 0.96 m in

height, consisted of two plain and two dressed ashlar masonry courses in granite arranged alternately one above the other as in the case of STR-1. Unlike the finely dressed courses of STR-1 the plinth courses of STR-3, were crudely dressed probably due to the nature of the granite used which was bluish in colour and granular in texture.

Excavations in the area in between STR-2 and STR-3 revealed what appears to be part of a huge platform oriented towards north-east. This appeared to have been enlarged at least twice, first by the addition of a pillared porch measuring 4.65 m (north-south) x 13.50 m (cast-west) parallel to it and fronted by a square tank and secondly by extending it further with a still bigger porch measuring 5.90 m (north-south) x 18.60 m (east-west). This enclosed the porch, the tank and the eastern part of STR-3. At this stage a big entrance was also provided from the east. The tank (T-2) in front of the first porch was square on plan, 2.20 m x 2.20 m, with a depth of 1.50 m. The interior was veneered with lime plastered rectangular granite slabs. A flight of four steps of 0.80 m width was provided on the western side. The north-south oriented rubble wall provided at the western end across STR-3 measuring 8.40 m in length with a height of 42 cm was again a later addition.

Providing a lime floor over the passage in between STR-1 and the remaining structures seemed to be the latest activity in the site as evidenced by the thick patches of lime floor which covered moulded courses of the plinth of nearby structure. The width of this passage measured 6.50 m at either ends and 8.50 m at the centre. Lime floor provided in two layers measured 18 cm in thickness.

A large number of stone, metal, terracotta and stucco objects were unearthed during the course of excavation. Among the stone antiquities, mention may be made of parts of medallions depicting lotus motif, entwined Nagas in relief, a bas relief of Lakshmi-Narasimha, Ganesha in high relief and a number of miniature Sivalingas in soapstone including one in rock-crystal. Several stone beads of various shapes and sizes and stone utensils were also encountered. A number of stucco figures depicting human busts in profile, were collected from the passage between STR-2 and the surrounding sub-structures.

Among the terracotta objects, beads and head portions of elephants were important. Metal objects comprised copper coins, rings, bangles and iron nails of varying sizes. Few broken ivory rings were also encountered The ceramic industry was represented by red, grey and black wares, besides Chinese porcelain.

32. Exploration in District Gulbarga.— In continuation of the previous season's work (*1981-82* pp. 26-27) in the Hunsgi valley, K. Paddayya of the Deccan College Postgraduate and Research Institute, Pune, carried out further explorations and discovered the following Stone Age sites.

Two Acheulian localities were found at Isampur and Devapur. These were of primary type connected with regular occupation and located within a distance of half a kilometre from the shale-limestone tablelands. The occupation horizon measured between 10 cm and 20 cm in thickness, and consisted of whitish grass mixed up with limestone pieces of various sizes and artifacts of limestone. In terms of areal extent, the horizons ranged between 25 m and 50 m in

diameter and were overlain by one to two metre thick, black cotton soil. The shallow nature of the black cotton soil proved that the Acheulian land surfaces were very similar to the present-day surfaces, thereby supplying one of the best examples of landscape stability in peninsular India, Likewise, the occurrence of these sites close to the foothill zone confirms the valley-floor occupation of the Acheulian groups. The artifacts from the Isampur localities were large and crude in workmanship.

Middle Palaeolithic and Mesolithic sites of the primary type were discovered at Isampur, Gungalgeri, Kaldevanhalli, Hunsgi, Konhalli and Chennur. The Middle Palaeolithic artifacts were made of reddish brown chert, and the Mesolithic artifacts of whitish chert.

A Neolithic habitation site was discovered about a kilometre west of the village Hunsgi. This site has covered an area of two hectares of cultivated land. The finds included pottery of red and grey fabrics, polished stone axes and adzes, hammerstones and rubberstones, saddle-querns, and artifacts of chert blade industry. The site yielded fragments of scoriaceous slag similar to the material comprising the ash mounds of south India.

KERALA

33. Exploration in District Idikki.— Raman Namboodri of the Southern Circle of the Survey during the course of village-to-village survey discovered seventeen menhirs, oriented east-west at Chinnakanal, 15 km south of Devikulam. He also noticed menhirs at Surianallur near Chinnakanal.

34. Exploration in District Palghat.— P. Rajendran, of the Deccan College Post-graduate and Research Institute, Pune, during the course of his explorations in the Bhavani River basin discovered six Mesolithic sites.

The various types of Mesolithic implements were mostly made on flakes. Blade elements and the microlithic forms were rare, and the percentage of finished tools was less. Artifacts were exclusively made on locally available coarse grained, milky quartz. The non-geometric and aceramic Mesolithic industry is more or less similar to those obtained from various parts of Kerala, coastal Karnataka, and Tamil Nadu.

MADHYA PRADESH

35. Exploration in District Bastar.— V.N. Misra and M. Lai of the Deccan College Post-graduate and Research Institute, Pune, in the course of their exploration located several Stone Age sites in the Abujhmar region.

Lower Palaeolithic tools made of quartzite and comprising handaxes, cleavers, choppers and flakes, were found on the left bank of the Panpunda River by the side of the culvert near Orchha village in Narayanpur Tehsil.

Middle Palaeolithic tools, also of quartzite and, comprising scrapers, flakes and blades, were collected from the bed of the Indravati River on its right bank opposite the village of

Bedre in Bijapur Tehsil.

A few ground stone celts and pestles were found on a ground in the forest about 500 m cast of the Lanka village in the same Tehsil. The site is said to be an earlier location of Lanka village.

36. Excavation at Khajuraho, District Chhatarpur.— In continuation-of last year's work (*1981-82* pp. 29-30) Lalchand Singh, of the Central Circle of the Survey, resumed excavation at Khajuraho with a view to understanding the nature and extent of previously excavated triple shrines with a common *mandapa* and *pradakshina-patha.* Excavations revealed a brick platform towards north and the *pradakshina-patha* wall exposed earlier, was further exposed twelve metres in length. The important find was a small shrine, encased with stone slabs depicting a female figure standing in *tribhanga mudra,* situated on the back side of *pradakshina-patha* wall and towards west of the platform.

37. Explorations in Districts Dhar, East Nimar and West Nimar.— Geo archaeological investigations were carried out in the Narmada valley between the town of Barwah (22°15′ N, 76°2′ E) and Barwani (22°2′ N, 74°54′ E),comprising parts of the districts of East and West Nimar and Dhar by S.N. Rajaguru, S. Mishra and J. S. Chingunde of the Deccan College Post-graduate and Research Institute, Pune. Two aggradational phases of the Narmada were clearly preserved in the fluvial deposits. Traces of the earlier aggradational phase were mainly in the upstream area. These sediments were occurring from the present river level upto a height of 13-15 m. The matrix of the gravel was sandy to clayey. The gravels were unconsolidated except for a cemented basal layer and occasional patches of cemented matrix within the gravel. Imbrication could be observed in most of the gravels. The predominant size class was large boulders (more than 70 cm in length). Exposures of weathered bouldery gravels were observed at Ganbgakheri, (22°14′ N, 76°2′E) and near Katgarha village (22°13′N, 76°1′E). Lower Pala eolithic tools were found *in situ* in these gravel. V.S. Wakankar reported (*1970-71,* p.19) Lower Palaeolithic tools from Barwah, Mortakka and Ramgarh. The younger aggradational phase was represented by sandy pebbly gravels and yellow silts and occurred from 0-20 m above the river level. Sediments belonging to this phase can be distinguished from those of the earlier phase on the basis of low degree of weathering of basalt, smaller size, frequent occur rence of cross-bedding, presence of blade tools, and absence of calcrete adherence to the clasts. Blade tools were found in association with the yellow silt. At Chota Barda (22°5, 75° 3 E) *in situ* blade tools one fragment of an ostrich egg-shell, burnt-earth, occasional bi-valve shells and animal bones were observed in a section. At Pitnagar (22°11′ N, 75°57′ E) also blade tools and fragment of an ostrich egg-shell were found from the yellow silt. One chalcolithic site was discovered at Nalway (27° 7′ N, 75° 12′E).

38. Exploration in Districts Raipur and Bilaspur.— R.P. Pandey, of the Deccan College Post-graduate and Research Institute, Pune, explored the River Seonath, (a major tributary of the River Mahandi)from Simga (21°37′ N; 81°42′E) to Amlidih (21°48′ N; 81°55′ E). The river has

preserved good alluvial sections along both the banks. At some places the deposit was more than 15 m in thickness. In these sections, two types of gravels occurred: low level gravels and high level gravels. These sections yielded Middle Palaeolithic and Upper Palaeolithic tools in stratified context- Such sections were observed near Karamsen, Nandghat, Limtara and Tulsi.

The Middle Palaeolithic tools were found on the ground and sometimes from the basal gravel along with the Pleistocene animal fossils of *Equus* and *Bos.* The species reported were: *Equus asinus, Equus namadicus, Bos namadicus, Bos indicus* and *Bubalus bubalis.* The Middle Palaeolithic tool-kit consisted of choppers, miniature handaxes, scrapers, borers, flakes and cores fashioned on chert, jasper and chalcedony.

The Upper Palaeolithic sites were located at the high level grounds at Simga, Tulsi, Nandghat and Karamsen. At Simga the industry was associated with fresh water molluscan shells. Some of the Upper Palaeolithic sites were discovered 5 km to 10 km away from the river. The tool types were scrapers, borers, burins, blades, flakes and cores dominantly fashioned on chert along with chalcedony and jasper.

39. Exploration in District Raisen.— P.K. Mukherjee of the Central Circle of the Survey, in the course of village-to-village survey noticed the following sites:

Tehsil	Village/Site	Antiquarian Remains
Bareli	Ahmadpur	Medieval Brahmanical fragmentary sculptures, architectural fragments and a *sati* pillar
-do-	Chargaon	Historical mounds
-do-	Gol	Historical mounds
-do-	Jamgad	Early Stone Age tools
Goharganj	Katao	Three painted rock-shelters of Mesolithic to Historical period
Bareli	Kanaiyapar	Historical mound with red ware
-do-	Khargot	Lord Mahavira alongwith other fragments of Jaina figures of Paramara period and *sati* Pillar
-do-	Pithanpur	Historical mound
-do-	Samnapur-barna	Historical mound
-do-	Untiya	Inscriptions of *V. S.* 1772
Goharganj	Utpahar	Five rock-shelters

40. Exploration in District Raisen.- S.S. Gupta assisted by A.S. Stevenson, A.J. Nam-

biraju, Pyara Singh, K.M. Girhe, P. Biswas and N.K. Nimje under the guidance of K.D. Ban-erjee of the Prehistory Branch of the Survey, explored the area around Raisen. In the course of exploration, they noticed an Early Stone Age site near Tikoda village (23° 17′ N, 78°59′ E) on Raisen-Sagar road, 22 km south-east of Raisen. There was a bed of loose stones, overlain by detrital laterite over which lies the top soil. The tools were exposed wherever the top soil was eroded. The stratigraphy suggests that the tools were manufactured after the deposition of laterite.

The collection included cleavers, handaxes, discoids, scrapers, knives, points, and re-touched flakes (pl, 29, 21). The cleavers were made mainly on side-flakes and were both 'U'-shaped and 'V'-shaped. Out of two hundred and ninty-one tools one hundred and twenty-five were cleavers while there was only one handaxe.

41. Exploration in District Raisen.— In continuation of the work on rock paintings in Central India (*1981-82,* pp. 35-36) S.S. Gupta assisted by A.S. Stevenson, AJ. Nambiraju, Pyara Singh, K.M. Girhe, P. Biswas and N.K. Nimje under the guidance of K.D. Banerjee of the Prehistory Branch of the Survey studied paintings in the rock-shelters at Ram-chhajja, Kharwai, Satkunda and Ghatla and also explored the area around Raisen.

Ram-chhajja (77°46′ E 23°19′ N) is situated on Raisen-Bhopal road, nearly 3 km southwest of Raisen. Fifteen painted rock-shelters were found in a range. Animal figures comprising those of deer, tiger , wild boar, leopard, elephant and cattle (pl. 22) and human beings, hunting (pl. 24), dancing, boxing, fighting and doing agricultural work (pl. 23) were drawn in white, chrome-orange and dark red, and on the ceiling of the shelters. There were instances where archers were shown using 'T' shaped arrows, which might have been bolts used to strike at the birds. The colours were found to be superimposed (pl. 25). Sometimes figures were repainted by a different colour. In one rock-shelter, an inscription in the Brahmi script painted in dark red colour was found, it reads *"Agatam"*.

Kharwai is located on Raisen-Bhopal road, 16 km south-west of Raisen. About fifty painted rockshelters were discovered in three groups. Paintings were drawn in white, light red, and dark red, and depicting hunting, dancing, fighting, scenes, geometrical and floral designs and animals. Sometimes white figures were shown with black outline.

In Satkunda (77°37′ E 23° 17′ N) 27 km south-west of Raisen on Raisen-Bhopal road, twenty painted rock-shelters were discovered. This group of rock- shelters was unknown so far. The paintings were drawn in white, yellow ochre and dark red colours depicting wild as well as domesticated animals, archers, dancers and trees (pl. 26). There are instances of super-imposition. For example, depiction of ladies' purses suspended from a tree, is found in dark red as well as in white colours. Microliths were found only in a few shelters.

Ghatla (77°00′ E 23°23′ N) is located on the Raisen-Sanchi road, 7 kms from Raisen. Three painted rock-shelters at Ghatla, and one at Gopalpur, were discovered. All the figures were painted in light red and chrome orange colours depicting elephants, wild boars, deers, hunters and boxes. No extinct animals were found in the painting, while recent potsherds and microliths were found on the floor. Buddhist structures near the shelters were not useful

in assigning an age to the paintings because the Buddhist syndrome was nowhere a subject of the paintings. Depiction of metal implements, wooden objects and costumes suggested a very late date, i.e. historical period.

42. Excavation at Nandur, District Raisen.— In continuation of last year's work, (*1981-82,* pp. 3637) the Directorate of Archaeology and Museums, Government of Madhya Pradesh and Saugar University, resumed excavation at Nandur, with a view to ascertaining the structural deposit of the Gupta-Kshatrapa and its extension. The excavation at NDR-V revealed the position of Pre-Mauryan levels in the light of previous results. The sequence yielded was the same as in NDR I and II. The notable antiquities included bricks measuring 20 x 15 cms from Kshatrapa level (layer 3), brick structure, iron nails, head scratcher with *'MA'* symbol, copper coins, stone torso of Vishnu and beads.

In the NDR III, eighteen trenches measuring 24 x 12 m were laid towards south naming NDR VI to find out the extension of the structure. During the horizontal dig all the structural deposits of NDR III, i.e. Muslim, Gupta, and Kshatrapa were noticed.

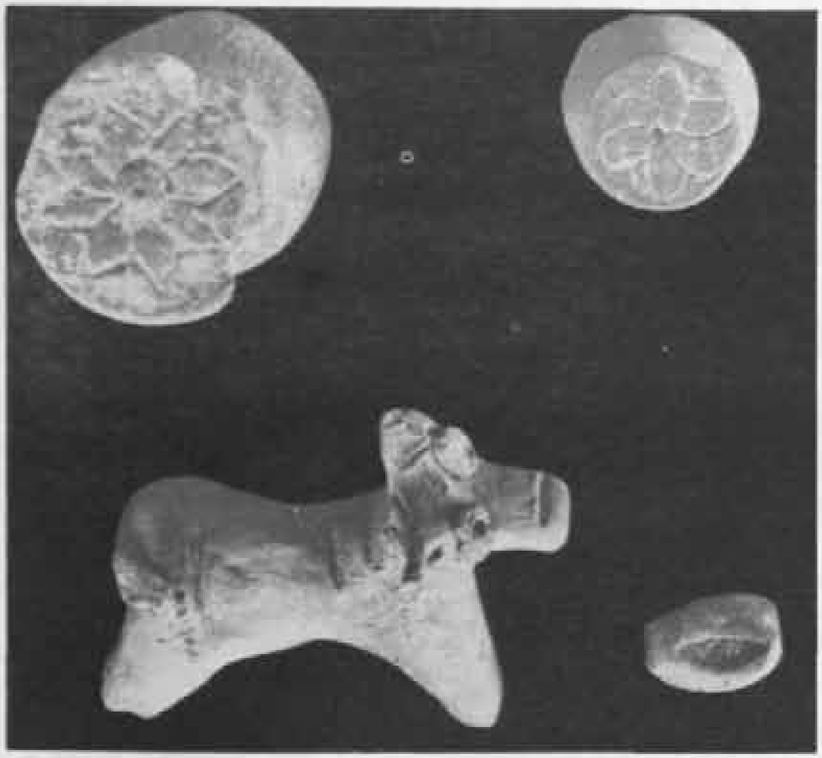
The deposit of Gupta phase yielded brick walls with two different sizes of bricks, drainage system with earthern conduits showing the flow of water from east to west and perhaps a part of a compound wall. The top layer yielded a rubble masonry wall and some coins of Muslim period.

As a result of excavations, the following periods could be established: Muslim period, early Medieval period and Gupta period.

43. Exploration in District Rajgarh.— M.K. Maheshwari and H.K. Jain of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, during the course of their exploration, noticed a number of brick structures and surface antiquities belonging to an Early Historical period. The interesting antiquities were N.B.Pware, punch-marked coins, terracotta figurines, beads of carnelian, stone plaques, and twenty-six stone structures dateable from the 9th to the 13th century AD.

44. Exploration in District Rewa.—Phanikanta Mishra, of the Central Circle of the Survey, in the course of village-to-village survey, noticed in Teonthar Tehsil, the following sites of archaeological interest: —

Village/Site	**Antiquarian Remains**
Adgadhnath Pahad	Remains of Siva temple of Kalachuri period and of dancing Ganesa, Vishnu, Hanuman and a panel showing Rama, Lakshmana and Sita belonging to the Kalachuri period.
Attaisa	Temple remains, sculptures of Mahishasuramardini,



15. Champa terracotta objects.



16. Goraj brick structure.



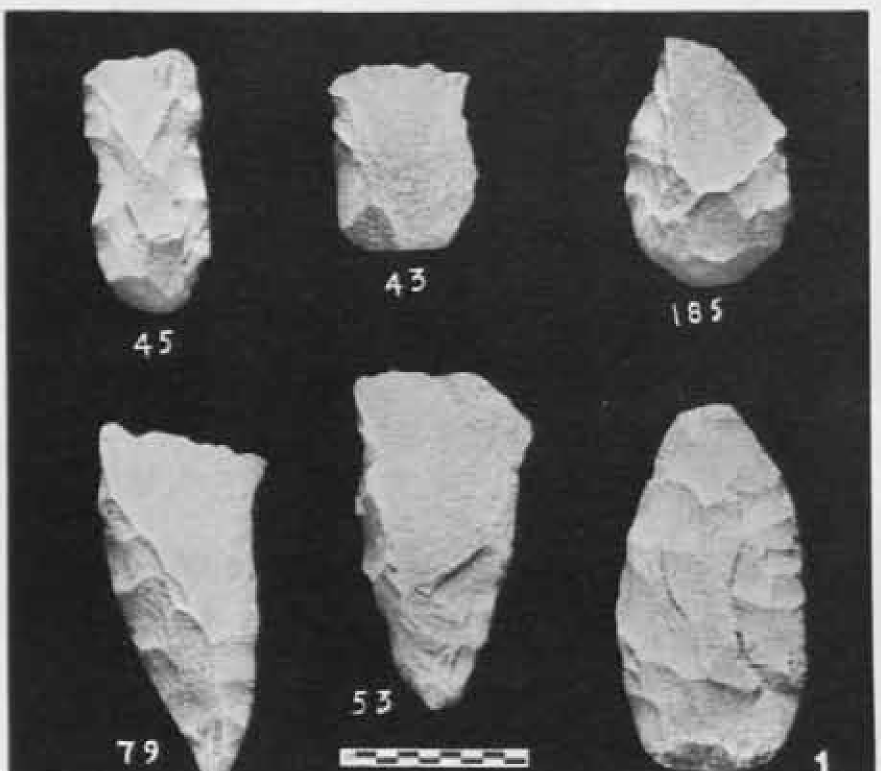
17. Hampi nobleman's Palace I,



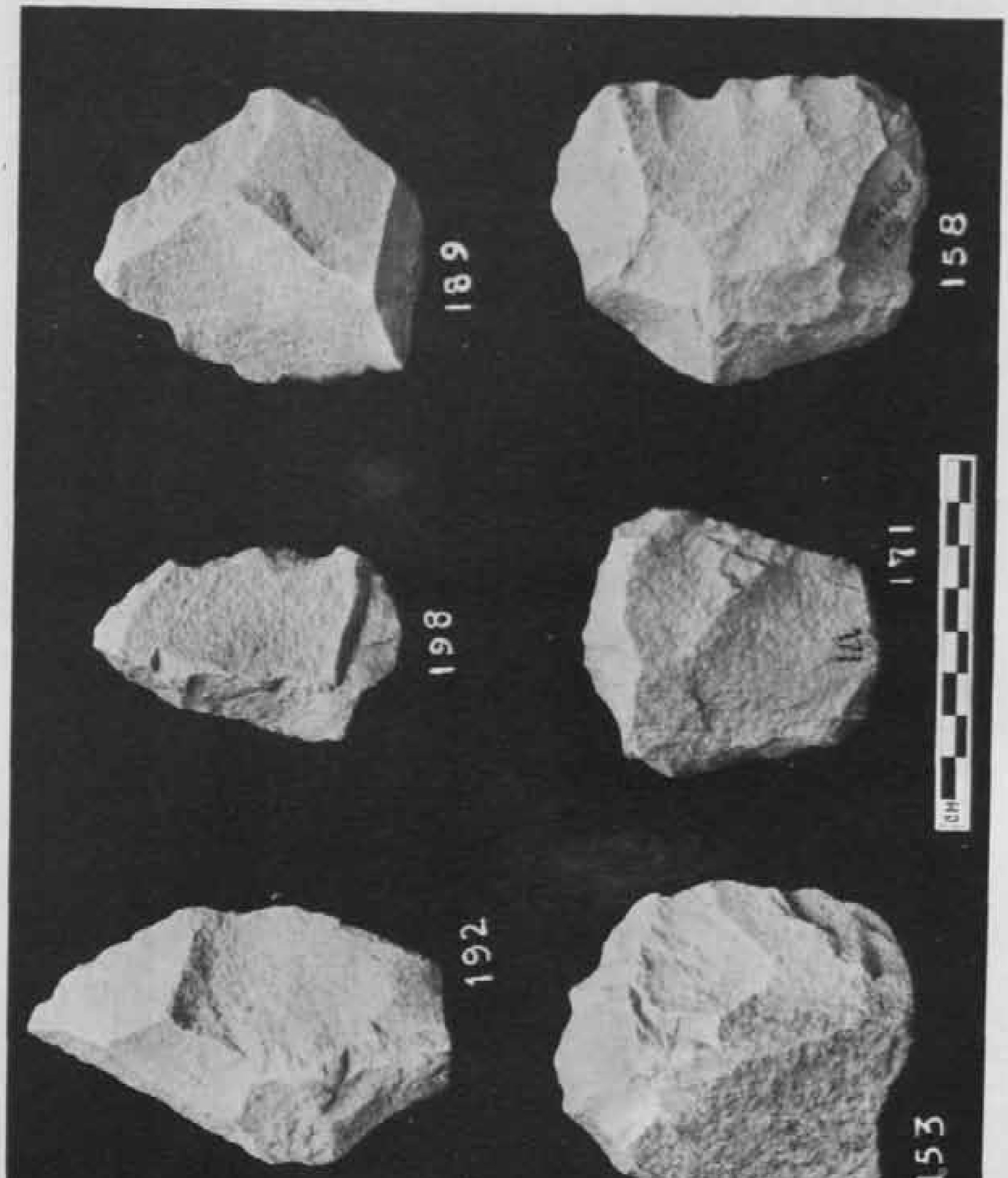
18. Hampi Virupaksha Bazar.



19. Hampi central Mandapa.



20. Tikoda Lower Palaeolithic tools.



21. Tikoda Lower Palaeolithic tools.



22. Ram-chhajja animal figures;



23. Ram-chhajja scene of agricultural work.



24. Ram-chhajja scene of hunting.



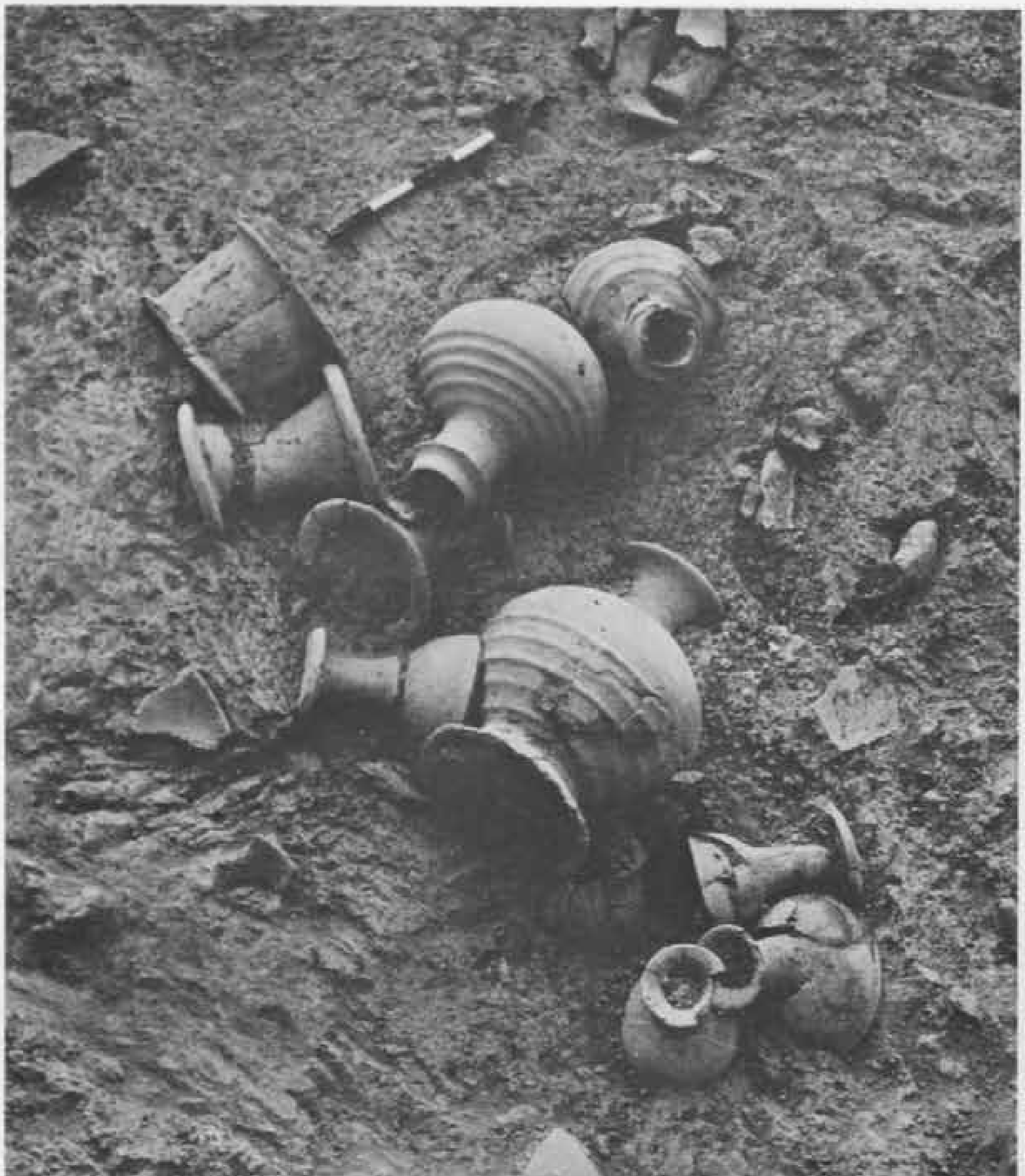
25. Ram-chhajja superimposition of paintings.



26. Satkunda painted rock-shelter.



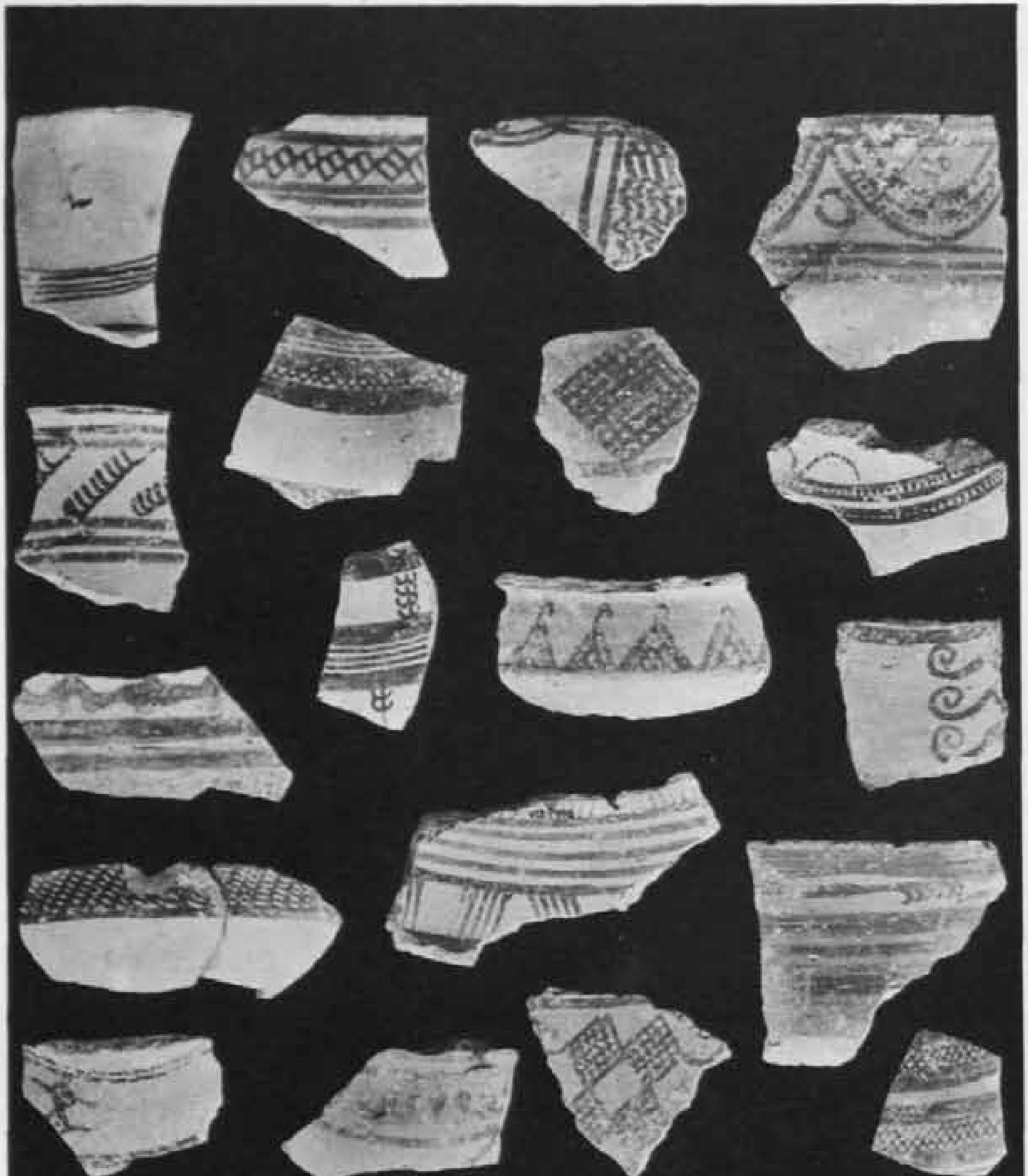
27. Dangwada copper objects.



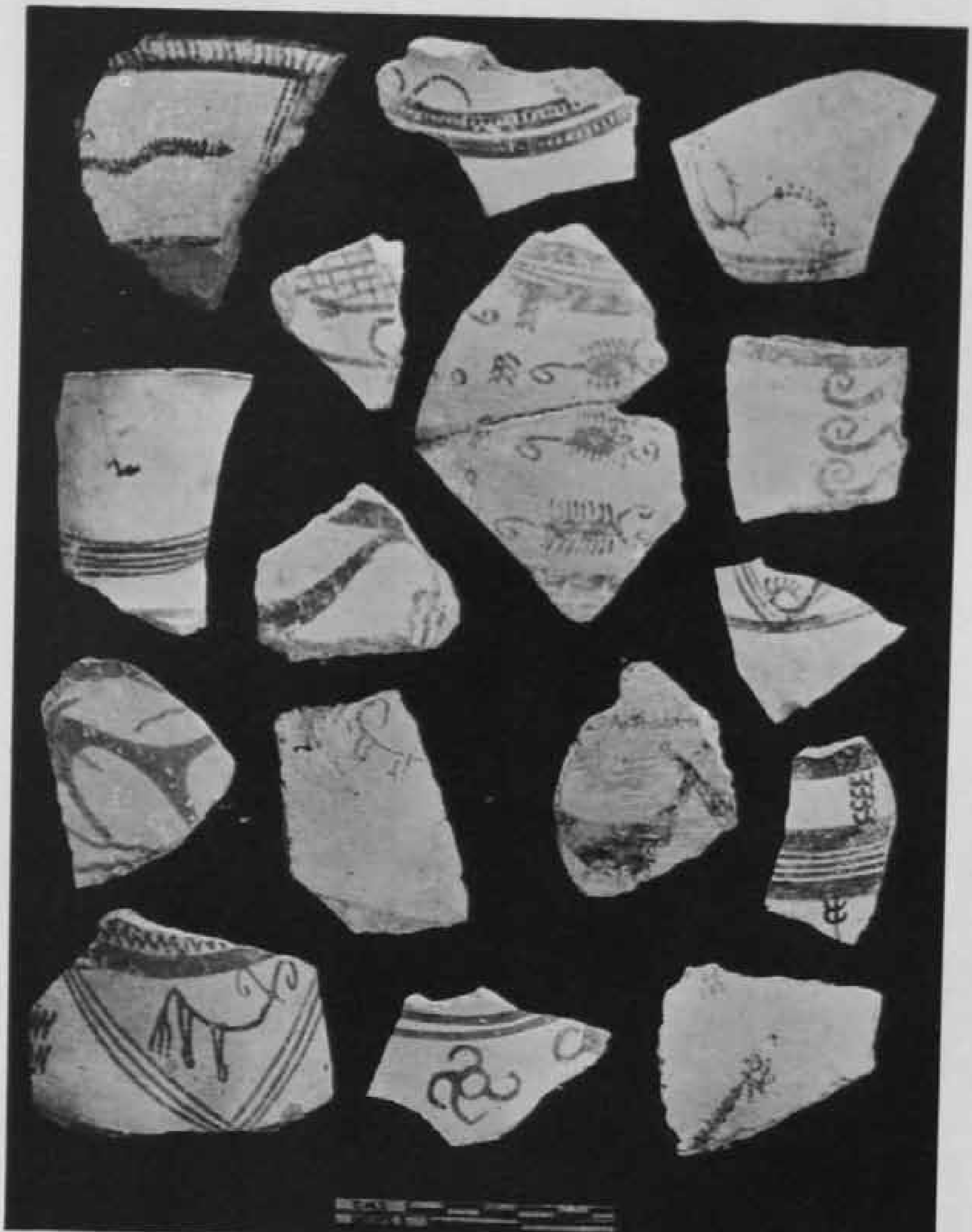
28. Dangwada Chalcolithic pots in-situ.



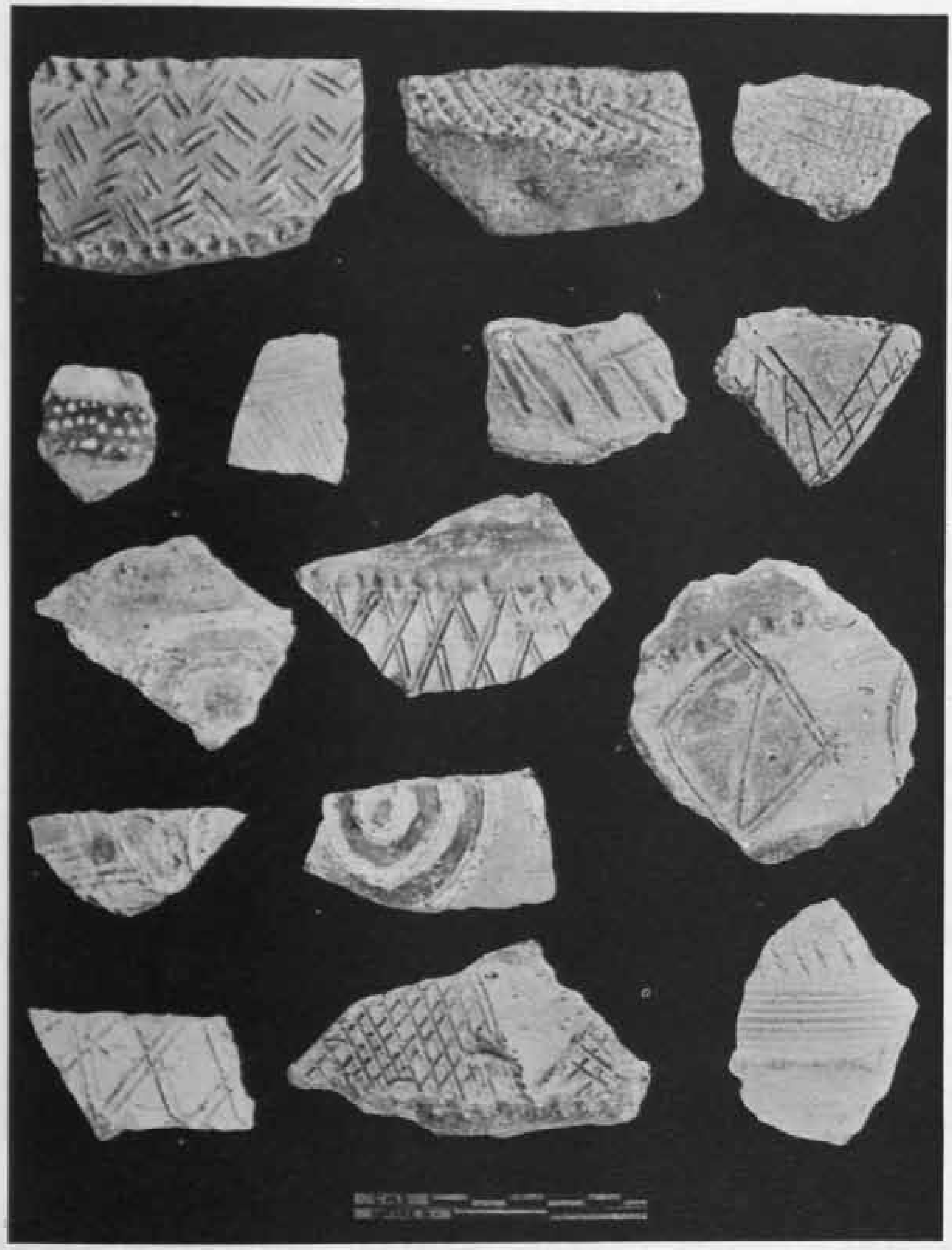
29. Dangwada Malwa painted potsherds.



30. Dangawada Malwa painted potsherds.



31. Dangawada Malwa painted potsherds.



32. Dangawada Ahar, incised potsherds.



33. Dangawada terracotta bull and bull forms.

Village/Site	Antiquarian Remains
	Ganesa, Parvati and architectural fragments belonging to Kalachuri period.
Behnawali Bandh	Mound along with terracotta figurines, beads and red ware of Medieval period.
Kanker	Siva, Kubera, Varaha, Hanuman and erotic figures belonging to Medieval period
Luke	Temple remains and Brahmanical sculptures of Kalachuri period.
Madighat	Three brick built Buddhist stupas, one fragmentary inscription of one line reading *'Tikhingutas'* in Brahmi characters of second century BC. Twenty- eight rock-shelters painted in red ochre colour, microliths, N.B.P. ware and Megaliths.
Madhpha	Siva temple of Gupta period.
Majhiari	Ruins of fortress of late Medieval period.
Sahlova	Brahmanical sculptures of late Medieval period.

45. Excavation of Bhaghor IV, District Sidhi.— R.K. Verma, V.D. Misra, and J.N. Pal of the Department of Ancient History, Culture and Archaeology, University of Allahabad, conducted excavation at Bhaghor IV with a view to ascertain the relation between Bhaghor I and Bhaghor IV.

Excavation revealed that the artifact assemblage from Bhaghor IV and Bhaghor I were morphologically and typologically similar. However, they were less in number at Bhaghor IV, suggesting that the excavated site might be on the periphery of the habitation.

46. Excavation at Banki, District Sidhi.— The Department of Ancient History, Culture and Archaeology, University of Allahabad carried out excavation at a Mesolithic site of Banki with a view to ascertain the stratigraphy. Excavation was conducted to a depth of 1.8 metre.

Microliths, stone fragments, querns, and mullers were found upto a depth of 60 cm. The lithic assemblage comprised scrapers, points, lunate and geometric types, such as, triangles and trapezoids. The raw materials used were chert and chalcedony. No potsherd was found during excavation. The site is almost identical with Bhaghor II and Medhauli I, both located in the same area.

47. Excavation at Medhauli, District Sidhi.— R.K. Verma, V.D. Misra and K. Thakur of the Department of Ancient History, Culture and Archaeology, University of Allahabad,, excavated at Medhauli with a view to ascertain the occupational deposit and the cultural sequence.

A large number of sandstone fragments, microliths, querns, mullers, and hammer-stones, were obtained.

The lithic industry of the site was characterised by the appearance of geometric shapes, particularly triangles and trapezoids. The tools were minutely retouched. Chert and chalcedony were the basic raw material. The excavation was conducted to a depth of 1.5 metre, upper 55 cm were rich in artifacts and stone fragments, from 55 to 71 cm the artifacts were found in higher number and below 1 metre the artifacts were absent. The evidence revealed that the site was occupied by the Mesolithic people for a considerable length of time.

48. Exploration in the Mid-Son Valley, District Sidhi.— A team comprising of R.K. Verma, V.D. Misra, B.B. Misra, J.N. Pandey, J.N. Pal, Ranjit Singh, Manik Chandra Gupta, and Kamlakar Thakur, of the Departmment of Ancient History, Culture and Archaeology, University of Allahabad, explored the Middle Son valley under the general direction of G.C. Pande and discovered a number of Palaeolithic, Mesolithic, Neolithic, Chalcolithic, and early historical sites.

Lower Palaeolithic artifacts were collected from seven sites, viz. Barhat, Lauwar, Lal-nahia, Karaundhawa, Murpeli, Kusera I, and Khuteli. Among these sites, at Kusera and Khuteli the artifacts occurred in a larger area and also in larger number. The artifacts were fresh and their geological setting suggest that artifacts of these sites are in primary context. The artifact assemblage consisted of handaxes, cleavers, scrapers along with a large number of cores, flakes, and debitage.

Middle palaeolithic artifacts were collected from six sites—viz. Barhat, Kubari III, Kargil, Bajaha II, Gedwa, and Kathar. The lithic assemblage consisted of cores, flakes, debitage and tools in different manufacturing stages. The tool types included various types of scrapers, points, blades and discoids. The raw materials used were quartzite and chert. As many as fourteen sites of the Upper Palaeolithic culture were located. The important sites were Mandaria, Barhat, Pipara, Khuteli, Bardi, Konia, Lauwar, Jignahwa, Balidan, Bamhari II, Kubari, and Kusera II. The artifacts recovered from these sites included flake cores, blades, blade fragments, chunks, retouched blades and backed blades.

A large number of animal fossils have been collected from the Bhaghor formation at Mandaria, Barhat, Pipara, Konia, Kargil, Kusera, Jetula, Baghawa, Baliyar, Sarra and Koldaha.

Eleven sites of the Mesolithic. culture have been located; the important ones are Bambari I, Hathinapur Kubari II, Kargil, Kusera II, Bajaha, Karaundhaiya, and Kathar. The assemblage included fluted cores, flakes, balde, flake and blade fragements, chunks of baldes, blunted backs, serrated blades, points, scrapers and lunates. The raw materials used were chert and chalchedony. The site of Bamhari I, located 8 km north-east of Chorhat, was found to be of great archaeological potentiality.

Cord impressed pottery, rounded celts, and ring stones, along with large sized basin-shaped querns, and mullers were collected. Neolithic celt and ring stones were collected from Dhodauhi on the left bank of the Son, I km south of Bhaghor.

Carin circle and cist within cairn were the main burial types of this region. Evidence of

the habitations of the Megalithic people was obtained from Koniya, Kubari and Kusumbhar. On the basis of their ceramic affiliation and other cultural traits, these sites may be divided into two groups—I, Chalcolithic-Megalithic (Kakoria group) and II, Iron Age Megalithic (Kotia group).

49. Excavation at Dangwada, District Ujjain.— In continuation of previous year's work (*1979-80,* pp. 54-55) a team consisting of Rajaram Singh, M.K. Maheshwari, O.P. Misra, and V. Joshi of the Directorate of Archaeology and Museums, and V.S. Wakankar, S.K. Arya, J.N. Dube, Giriraj Kumar, A.S. Odhekar of Vikram University carried out excavation at the Boresh-war mound, Dangwada.

Five trenches were laid during this session, numbering X, XI, XII, IV and VII. Trench X gave a lot of historic terracottas, seals, and structures. The top layers gave pottery of the Paramara period. Below that, the nature of the pottery changed to painted Red Ware decorated with horizontal lines in black, white and red, colours with an occasional find of fine Red and Kaolin ware. Terracotta figures of the standing Buddha, Hariti, Lajjagauri, and slate stone plaques of Mahishamardini and Vishnu were also obtained. Stone plinths, brick-bat structures, well-paved floors were encountered. A seal with an early Gupta character reading 'Jeewadaya' was also obtained. Below this, Kushana-Saka occupation was exposed with the same pottery tradition, along with a silver coin of Kshatrapa Rudrasena and terracotta human and bull figures.

Layers (8) to (14) indicated a change in the pottery, red burnished, and black burnished ware, increased and the painted pottery of the Gupta-Kushana tradition diminished. Terracotta figures of horse, elephant-rider, coins of Ujjaini-type with Dandadhari, tree in the railing, Shaderchakra and river symbol on obverse and Ujjaini symbol on reverse were obtained. A figure of Lajjagauri in slate stone with the coiffure and head ornaments of Sanchi yakshini tradition was also recovered.

Layers (14) to (17) yielded a highly burnished black-and-red-ware and N.B.P. with dishes and bowls dominating tan burnished storage jars, unslipped lotas and big storage jars. Punch marked coins, cast copper coins, with elephant-rider on obverse and a hallow cross or *sumera* symbol on the reverse were obtained from this deposit.

Layers (17) to (19) indicated as Pre-Mauryan occupation yielded early N.B.P. bowls with corrugated sides, typical Ganga valley gray-ware, highly burnished black and red ware, local rough grey ware, tan ware, and cast copper coins. The site gave an evidence of Pre-Mauryan, coinage of cast copper type. The underlying deposit yielded grey ware, while black-and-red ware continued. A copper-smith's house with two furnaces, several broken crucible with smelted pieces of copper, copper antimony rod, ring pieces and wire were unearthed (pl. 27). A mould of Mother-Goddess was also obtained from this level.

A layer of black-soil below was formed either due to habitational gap and thick vegeta-tional growth or, as the site was deserted for long duration due to an devastating deluge. The top deposit yielded ceramic industry of Pre- Mauryan tradition with Malwa ware lingering. Occasional fire places indicated temporary occupation. The lower levels of this 50 cm deposit

gave a pure Malwa phase with dominating black-on red ware. Layers (20) to (23) were of the Malwa-Chalcolithic occupation.

Trench XII was taken up on the southern slope. A stone plinth of the Sunga period was observed in the top layer, below the plinth, Sunga occupation continued giving a straight Iron sword, cast copper coins, and black-and-red ware. The flood of the Pre-Mauryan times was indicated by a weathered fissury grey ashy soil resting on the light brown soil giving Pre-Mauryan and Malwa ceramic mixture. From this layer a Mother-Goddess was obtained.

The historic levels in trench XI yielded Maurya-Sunga material such as, punch- marked coins, castcopper coins, black-and-red-burnished wares and N.B.P. Ware; followed by a layer of well-sorted sandy silt of 40 to 60 cm thickness. Below this occurred the greyish layer indicating weathered black soil giving N.B.P. and local grey ware which can be dated to c. 700 to 400 BC. It also gave evidence of cast copper coin. It was followed by highly disturbed black soil with Malwa culture giving various types of pots (pl. 28) such as Jar-on-stand, dishes-on-stand, cups-on-stand, and narrow necked pots kept on round stand and potshreds with various designs (pl. 29) (pl. 30,31). The rectangular houses which were made of mud, were in the north-south alignment with an opening to the east. These were having round platform in the centre.

The excavation of baulk between XI and IV gave an unique evidence of storage house in the very first habitational layer. In an undisturbed burnt house, three unpainted, one incised and two painted storage jars were found *in situ.*

Previous excavations were given four phases of Malwa occupation but this year's excavation clearly indicated five phases of Malwa occupation.

Following are the main phases at Dangwada:

Period		Description
IX		Glazed ware of Muslim period and Muslim coins found.
VIII		Pratihar, Paramar pottery and stone sculptures, horse of crude type.
VII		Painted red ware; Terracotta Buddha and Hariti figures inscribed seals, Vishnu and Mahishasurmardini, Lajjaagauri, figures of horse and elephant riders.
VI		Absence of Black and red ware, painted red ware dish-cum-bowls and Kshatrapa coins.
V		Black and red ware, red ware, dish-cum-bowls, cast copper coins, Ujjaini coins, inscribed seals, yajna-shala and Siva-temple remains.
IV	a.	Black and red ware, grey ware and early N.B.P., cast-copper coin.
	b.	Black-and-red ware and late N.B.P. No grey ware and punch-marked coins.
	c.	Malwa with Pre-Mauryan ceramic industry.
III	d.	Malwa with the same tradition, rectangular house continue.
	e.	Malwa with Suparma and Sun symbol begins. Bulls not present, apsidal temple found.
	f.	Malwa with Bull, deers-the bulls diminish temple and yajna-kundas found.

Period	Description
II a.	Dominant Ahar—absence of Kayatha, incised potsherds (pl.32). Bull forms and bulls present (pl. 33).
b.	Malwa dominates but Ahar equally present, Bull forms and bull continue.
I a.	Pure Kayatha
b.	Kayatha and black-and-red.

MAHARASHTRA

50. Exploration in District Ahmednagar.— M.R. Dhekane of the South-western Circle of the Survey, in the course of his exploration, discovered a large number of Upper Palaeolithic tools at Bhojade, black-on-red pottery at Rastapur and at Shingwe.

51. Exploration in District Jalgaon.— S.N. Raghunath of the South-western Circle of the Survey, during the exploration, in the Upper Tapti valley discovered Chalcolithic sites at Boraval (75°31’ N and 20°21’ 72” E), Dhanora (75°32' N and 21°6’8” E) and Viravali (75°28’ N and 21° 8’8” E).

52. Excavations at Bhagi Mahari, District Nagpur.— The Department of Archaeology, Deccan college Post-graduate and Research Institute, Pune, and the State Department of Archaeology and Museums, Bombay, represented respectively by S.B. Deo and A.P. Jamkhedkar, excavated the Megalithic Stone Circles and Megalithic habitation at Bhagi Mahari (78°51’ and 21°24’) situated on the river Kolar 45 kms north of Nagpur. The excavations were carried out because of two considerations: i) this was a site with more than seventy Stone Circles and an extensive habitational mound of the same period, and ii) this happens to be the northern most megalithic site in the District of Nagpur.

Two trenches, each measuring 4 m x 3 m. were laid, one each on the two habitational mounds. The total habitational deposit was 2.25 m, divisible in nine layers. These trenches revealed a number of floor levels, each made of a bedding of black clay, covered over by compact brownish clay, the surface of which was plastered with lime. The plan of the house was circular having a diameter ranging between 3.25 and 3.80 m. The periphery of such houses was marked by wooden circular posts. Inside the houses were found remains of semi-circular clay hearths. A large number of animal bones and burnt grains which included wheat, barley, black gram, and rice, were recovered. The animal bones recovered in these huts were those of horse, cattle, sheep, goat, and pig. A large amount of bones of birds, in several cases partially burnt, were recovered in the earlier stages of the occupation. Several of these were worked obviously to serve as an artifact.

The pottery consisted of thin, glossy black-and-red, the thick and brittle micaceous red, the black burnished and painted black-on-red. The painted pottery was akin to that reported from the megalithic habitations at Naikund, Khairwada and Takalghat. The painted pots were

essentially globular in shape and bear on their external surface simple designs like groups of lines, hatched squares and triangles, etc. In the uppermost layer the painted pottery reduced in amount and the black-and-red get thick, recalling the black-and-red of the Satavahana period.

The habitational deposits gave iron axes with cross-ring fasteners, knives and daggers, and fragmentary copper bangles. There was also evidence of a hearth for the purpose of preparing fine lime from shells.

Close to the habitation were the Stone Circles, three of which were excavated. Their diameter ranged between 9 and 14 m. These Circles revealed black-and-red ware, micaceous red ware, the black burnished and the painted black on red. Iron objects like axes with cross-ring fasteners, knives, daggers, arrowheads, and bangles, besides, objects of copper such as bangles and fragments of decorative lid finials as reported from Takalghat and Mahurjhari were also noticed. A few fragmentary teeth and bones of the horse, as also a few human teeth were recovered from the Stone Circles. The most noteworhty feature of these Stone Circles, which was not noticed at any of the sites excavated so far, was the placement in a slanting position within the Circle of a huge block of Gondwana formation.

The Bhagi Mohari Stone Circles gave evidence for the first time of stone constructions within the Stone Circles. There were three categories; i) the construction of two square chambers with a common middle wall built of medium sized boulders set in black clay (pl. 34) and these boulders were much smaller in size than peripheral boulders of the Stone Circle. Each chamber was 3 sq. m. A passage ran east-west; ii) a smaller circle at the centre of the stone circle and it was arranged with the help of medium size boulders set in black clay. The circle had an opening of a little less than 1 m in the southern direction (pl. 35); iii) an irregular circular alignment of medium sized boulders within the Stone Circle.

53. Excavation at Inamgaon, District Pune.— In continuation of the last year's work (*1981-82,* pp. 50-51) the excavation continued on the most extensive habitational area at the site (INM-I). The excavation was planned by H.D. Sankalia and carried out by M.K.Dhavalikar and Z.D. Ansari of the Deccan College Post-graduate and Research Institute, Pune, assisted by Vasant Shinde, Y.S. Rasar, V.G. Vishwas Rao and Shubha Atre. The entire project is funded by the University Grants Commission.

The main objective of this year's work was to expose the houses belonging to the fag-end of the period of habitation (Late Jorwe, c. 1000 BC to 700 BC). In all five houses, House No. 129 was rectangular and it was the largest so far unearthed in the upper levels of a Late Jorwe period. It measured 7.75 x 3.85 m. The floor of the house was at several places, exposing the gravel below and was destroyed by fire as was evident from the burnt lumps and posts.

The house yielded a number of storage jars, two of which contained charred grains in good quantity. A huge storage jar was found almost in the centre of the house. It was half buried in the floor and on the shoulder it was decorated with an applique rope pattern in which was set a panther with a prominent organ (pl. 36). The house contained no fire pit (*chulah*) inside. However, house No. 130, a small circular hut, located close by on the north-western corner of house No. 129, contained a large fire pit (1.6 x 1.20 m), which was probably

the kitchen of house No. 129.

All other houses were also rectangular on plan, except house No. 133, which was squarish. House No. 133 yielded one bone marker, a bone knife made on rib, and a fine antler chisel. The house No. 134 which was also destroyed by fire yielded the remains of a fully baked four legged clay jar.

A number of burials, both child and adult, were exposed. However, in a majority of cases some limbs were missing (pl. 37) or they were not in their proper position.

The important aspect of this season's work was the aerial survey of the site, which was carried out by S.V. Bhave, an eminent surgeon of Pune. The aerial photographs revealed some new features: i) a ditch (195 x 20 m) running in a straight line. This probably was the passage to the main habitational area. It appears that the ditch was filled-in by the flood water coming through the streams on either ends and ii) an irrigation canal (420 x 6 m) running in a straight line. In all likelihood, the canal might have received water from the main canal, which is not far from INM-V. Both these features can be ascribed to the early Jorwe period (C 1400 BC to 1000 BC).

54. Explorations in District Thana.— S.N. Rajaguru, M.D. Kajale and Savita N. Ghate of the Deccan College, Post-graduate and Research Institute, Pune, carried out detailed field mapping of the deposits around Sopara, 30 km north of Bombay. A number of freshly dug trenches for the foundation of buildings within an area of 40 km revealed the following composite stratigraphy.-

Depth below the surface (m)	Lithological Unit
0-1.5	Disturbed habitational debris sharp contact to
1.5-3	'Karal' or loose and consolidated with shells
3 - 5	grades to greenish grey clay, locally known as 'Mendh' , rich in drift woods.

Habitational debris yielded pottery of an early Historic to Muslim period, 'Karal'm, occurring 2 m above Mean Sea Level in well section yielded a few flakes and blade-flakes on chalcedony. Stratigraphical context of the tools suggested that Mesolithic or Epi-Palaeolithic culture existed in this area during the early Holocene.

Carbon-14 dates on shell and wood samples revealed the following data:

B.S.Ref. No.	Sample	Depth (in relation to MSL)	Site	Carbon -14 Date
311	shell	+1.5	Gas Lake	5220±100 BP

B.S.Ref. No.	Sample	Depth (in relation to MSL)	Site	Carbon-14 Date
381	shell	+1.5	Joshi well (Bhuigaon)	2755±100BP 3390±l 10 BP
378	shell	+1.0	Simon O'obre well	3260±70 BP
412	wood	+1.0	Varaletalav	6300±120 BP
413	wood	MSL	Siddiki trench	6560±130 BP

Geomorphological and geochronological studies of littoral sediments showed that the sea level around 6000 BP was close to the modern level and later on it fluctuated within an amplitude of —0.5 to+2m during the mid-Holocene (between 6000 and 3000 yrs BP). These changes were essentially due to variations in wave-energy, precipitation, erosion, rate of sediment deposition, and sediment supply.

MANIPUR

55. Exploration in District Chandel.— O.K. Singh and S.R. Singh of the State Archaeo logy Department, Manipur, and T.A. Singh, a research student carried out exploration and discovered a cave site, in the midst of forest hill-ranges near the Burma border. The cave is locally known as *'Songbu'* A few artifacts consisting of scraper, borer-cum-hollow scraper, knife, flake-blades, flakes and cores were found inside and outside the cave.

ORISSA

56. Exploration in District Cuttack.— Orissa State Department of Archaeology explored the Chitropala valley and the Daya valley. In the course of exploration they noticed the ruins of monuments dateablebetween eighth to seventeenth century AD. The antiquities recovered were of the Buddhist affinity. A Buddhist monastery (tenth century AD) was also located near Salipur. The important monuments noticed were; Swarhajaleswar temple at Golapur, Siva temple at Beraboi, Khileswara temple at Khileswar and Somnath temple at Ghoradia.

57. Excavation in District Phulbani.— In continuation of the previous year's work (*1981-82* p. 54) S.B. Ota of the Deccan College Post-graduate and Research Institute, Pune, laid two trial pits at an open air Mesolithic site (20°47' 35" N, 83°5T 55" E) popularly known as Khomananta near the village Kalarajhuli, with a view to ascertaining the undisturbed cul tural horizon and the stratigraphical context of the microliths.

The site was situated on an oval-shaped, flat ridge, lying 10 m high and 2 km south of the river. A seasonal stream called the Adapatharjura flows on the eastern side of the ridge. The artifacts were found scattered in an area of 30,000 sq. m.

The trial pits were dug on the eroded surface of rain-gully and exposed a 1.35 m thick

deposit of red soil resting on laterite. The upper 80 cm thick portion of the sediment was sterile, the cultural material was found in the bottom portion measuring 55 cm in thickness, the principal raw material used was quartz; chert, chalcedony and quartzite.

The assemblage consisted of simple artifacts and retouched tools were small in number. The latter consisted of triangles, backed blades, retouched blades, and crescent. Heavy tools were found alongwith this assemblage comprising of unifacial pebble tools, large flakes, ring stones, retouchers, anvils, and hammer stones. Surface exploration yielded a few polished stone celts of dolerite.

Trial pits dug at this site showed that the Mesolithic occupation at this site was a prolonged one and that even the heavy tools form a part of the Mesolithic industry.

58. Exploration in District Phulbani.— SB. Ota of the Deccan college Post-graduate and Research Institute, Pune, in the course of his exploration discovered a Mesolithic site at the foot-hill of Kuchunibhuguradungri (20°48’ 15” N and 83°50’ 10” E).

PUNJAB

59. Exploration in District Sangrur.— G.B. Sharma, Kuldip Singh and Yograj of the Department of Cultural Affairs, Archaeology and Museums, Punjab, carried out explorations in the area adjoining Rohira and discovered the following sites: —

Site	**Cultural Assemblage**
Maholi I	Late Harappan
Maholi II	Medieval
Kalyan I	Medieval and Early Historic
Kalyan II	Pre-Harappan, Mature Harappan and Late Harappan
Dhaler Kalan	Kushana and Medieval
Jalwana	Kushana
Johlan I	Kushana and Medieval
Johlan II	Kushana and Medieval

60. Excavation at Rohira, District Sangrur.— The Department of Cultural Affairs, Archaeology & Museums, Punjab, under the direction of G.B. Sharma, assisted by K.K. Rishi, Kuldip Singh, Yog Raj, Balwant Singh and Harpreet Singh, resumed excavations with a view to understanding i) the settlement pattern of the Harappans and Pre-Harappans, and ii) the details of fortification wall.

A series of six metre square trenches were laid; two trenches were dug upto two different levels and four trenches were dug upto the virgin soil. The excavation revealed four periods of occupation as noticed earlier.

Period I-A represented by yellow silt yielded wheel thrown pottery, light and thin in

fabric, red to pink in colour and painted in black. The pottery types were vases, storage jars, bowls and dishes. The painting consisted of geometric designs, horizontal bands, loops, crisscross lines and fish scales. Only a few structures of sun-dried bricks (10 x 20 x 30 cm) were noticed. It was not possible to a get complete plan of the houses. An oval-shaped furnance and a gold-foil were found in a house indicating that it was probably a gold-smith's house. Anti-quities recovered were terracotta bull figurines, toy-cart wheels, terracotta bangle pieces, beads of steatite, agate, carnellian, and bone stylli.

Period I-B represented the arrival of Harappans, and pre-Harappans continued to live side by side. Pre-Harappan pottery occurred in a large quantity. A fortification wall wasraised as a defence. There was intensive constructional activity of the Harappans at the site (pl. 38). The Harappan pottery was thick and sturdy. The main pottery types were dish-on-stand, cup-on-stand, perforated jars, storage jars, troughs, dishes, bowls, vases and beakers. The paintings were usually in black and graffitti marks were noticed on several sherds. The important antiquities recovered were two terracotta sealings (pl. 39). The other sealing depicting a standing human figure along with Harappan symbols. A beautiful square button of steatite with a swastika symbol and beads of various shapes and material were also recovered. Other terracotta objects were bangles, bulls, toy-cart frames, and hubbed wheel, balls and cakes of various shapes and sizes. Bone objects recovered were stylii, points and spatulas. Copper objects such as chisels, arrow-head and parallel sided blades with serrations on one side were also discovered.

Period I-C was confined to the habitation of Bara folks who probably came on the site after the desertion by Harappans. No structures were noticed. An urn having remains of a skull and teeth of a child were recovered.

Period II was represented by black-slipped pottery with associated red ware, terracotta beads, terracotta animal figures, sling balls, stone pestle, and copper bell.

Period III was confined to the centre of the mound. It was possibly a rural settlement. One coin of Gondopharnese and a few coins of the Late Kushan period were recovered from the surface.

Period IV was represented by knife-edged bowls and other associated wares.

RAJASTHAN

61. Exploration in District Chittaurgarh.— During the course of his exploration, Narayan Vyas of the Western Circle of the Survey discovered the following sites:

Village/Site	**Cultural Assemblage**
Bodiana	Microliths and Medieval pottery
Jantla-mata	Temple (seventeenth century AD)
Narpat-ki-Kheri	Ruins of a temple (fifteenth century AD)

Village/Site	Cultural Assemblage
Pandoli	Ancient embankment, ruins of early Medieval temple and sculptures.

62. Exploration in District Chittaurgarh.— In the course of exploration in Chittaurgarh Taluk, S.R. Shrimali of the Western Circle of the Survey brought to light the following sites:

Village/Site	Cultural Assemblage
Badodia	Vishnu temple of eighteenth century AD
Bamania	Black-and-red-ware
Bhilon-ki-Jhopadiyan	Step-well and Hanuman temple (eighteenth century AD)
Chitori	Middle and Late Stone Age tools
Eral	Medieval Brahmanical sculptures
Gopalpura	Ruins of Vishnu temple (eighteenth century AD)
Katoria	Temples of eighteenth century AD
Lakha-khera	Vishnu temple of eighteenth century AD
Mandaldeh	Late Medieval Vishnu temple
Narela	Brick structures (second-third century AD)
Netwal	Medieval Siva temple, sculptures, bronze image of Vishnu, Medieval Site with pottery, arms and weapons of sixteenth to eighteenth century AD
Panchli	Ruined haveli (seventeenth century AD)
Purchiton ka-Saunta	Step-well and temples of *circa* seventeenth century AD
Rolakhera	Chhatris of *circa* seventeenth century AD
Sissodion-ka-Khera	Late Medieval Vishnu temple
Shankargarh Math	Siva temple of Late Medieval period and chhatris of seventeenth century AD
Siorori	Late Medieval Vishnu, Siva and Ambamata sculptures and a temple of seventeenth-eighteenth century AD
Sivagarh	Ruined Late Medieval fort
Surajpol	Early Stone Age tools, Medieval Jain and Brahmanical sculptures, ruined Siva temple and step-well of seventeenth century AD and an inscription dated to Samvat 1873.
Urund	Chhatris and Siva temple of seventeenth-eighteenth century AD

63. Exploration in District Nagaur.- In continuation of last year's work (*1981-82,* pp. 58-59) V.N. Misra, S.N. Rajaguru, Makhan Lal, Vijay Singh, S.C. Nanda, and Hema Raghavan of the Deccan College Post-graduate and Research Institute, Pune; Claire Gaillard of CNRS, Paris, and M.A.J. Williams of the Macquarie University, Sydney, carried out an exploration in and around Didwana. A large number of Middle Palaeolithic artifacts were collected from the Mangalpura quarry, 30 km north of Didwana. A small number of them occurred *in situ* in the upper part of the Amarpura formation . The staining of the artifacts showed that except for a few, all of them came from the upper part of this formation. A number of Middle Palaeolithic artifacts were collected *in situ* from the upper part of this formation in the quarries at Jenana, Shyampura, Baklia and Badela, north and northwest of Didwana.

In addition to these explorations, a large volume of geomorphic and sedimentological data have been collected from bore holes, wells, tanks, and quarries. Sand and carbonate samples for palaeomagnetic assays and, for TL and C-14 dating were collected from several localities.

64. Excavation at Didwana District Nagaur.— In continuation of last year's work (*1981-82,* pp. 56-58) V.N. Misra, S.N. Rajaguru, Makhan Lal, Vijay Singh, S.C. Nanda and Hema Raghavan of the Deccan College Post-graduate and Research Institute, Pune, Claire Gaillard of CNRS, Paris and M.A.J. Williams of the Macquarie University, Sydney, carried out excavations in the dune at 16 R, Didwana. Last year's trench was further dug vertically to a depth of 18.5 m without reaching the bed rock or non-aeolian deposit. Four calcrete bands were encountered below a 16.5 m depth reached last year. Two small assemblages of artifacts were found at 17.20 and 18.40 m thereby proving the history of human occupation on dunes too much older than any known so far. These assemblages, made on quartzite and quartz include flakes, blades and cores, and in the case of the lower horizon also one specimen each of chopping tool and scraper. Because of the small size of the assemblages it was difficult to determine their cultural age but stratigraphically, they would belong to the Lower Palaeolithic stage.

Horizontal excavations carried out in 8 sq m in Unit II of the dune last year was extended over a further area of 22 sq m. The main concentration of artifacts was between 5.40 and 5.65 m. The distribution of artifacts per sq m was fairly uniform, the average being 23.40. The industry, made of quartzite and quartz, consists mainly of flakes and blades. Finished artifacts include 15 scrapers, 4 handaxes, and one piece each of chopping tool, cleaver, notch, and point. The density of artifacts suggested that this horizon to represent a regular occupation and not casual human visits. The sand layer with most dense concentration of tools also contained rounded carbonate pellets, thereby suggesting a certain degree of water transport and a comparatively humid climate. In terms of the technology and size of artifacts, and the stratigraphic position, the industry belongs to a late Middle Palaeolithic or Early Upper Palaeolithic stage.

Stray artifacts were found throughout the lower part of unit II (6.10—8.65 m) and the upper part of Unit III (8.65—12.5 m) and testify to the more or less continued presence of

man in the region during the period of dune building and arid climate. The stratigraphy of the dune now includes 4 major soil horizons, and 16 calcrete bands, the former representing major wet phases and the latter minor wet phases.

65. Excavation at Singi-Talav, District Nagaur.— In continuation of last year's work (*1981-82* pp. 58-59), V.N. Misra, S.N. Rajaguru, Makkhan Lal, Vijay Singh, S.C. Nanda and Hema Raghavan of the Deccan College, Post-graduate and Research Institute, Claire Gaillard of CNRS, Paris, and M.A.J. Williams of the Macquarie University, Sydney, carried out excavation at Singi-Talav with a view to ascertaining the depositional environment of the sediments, straitigraphy, and distribution pattern of the Acheulian artifacts.

Two trenches of 16 sq m each were dug. These trenches cover the zones A, B, C, D, E, F, G and H (from west to east) and squares 9, 10, 11, and 12.

The stratigraphy of both trenches was essentially the same as noticed last year. Layer 2 of greyish silty clay, underlying layer 1 of recent sand, thins out and then disappears towards the west. It yielded a few rolled scrappers, points, and flakes of Middle to Upper Palaeolithic type. Layers 3-5 belong to the Amarpura formation and yielded Acheulian tools. In layer 3 small and redeposited *kankars* were predominent while in layer 4 bigger and *in situ kankars* were common. These two layers appeared to represent two occupation phases. Most of the artifacts occurred at the base of layer 3. Layer 5 was basically similar to layer 4 but is archaeo-logically very poor. Layers 3 and 4 alone were archaeologically significant.

On the basis of preliminary classification, the frequencies of main classes of artifacts in these two layers were as follows: Layer 3: total artifacts 88, small tools 13 (14.8%), large tools 11 (12.5%), flakes 36 (40.9%), debris 26 (29.5%) and blocks 2 (2.3%). Layer 4 : total artifacts 52, small tools 41 (7.9%), flakes 208 (40.0%), debris 226 (43.5%) and block 18 (3.5%). These figures are similar to those from last year's excavation. Both layers included finished tools as well as debitage, the difference being the lower percentage of finished tools and the higher percentage of debris in layer 4. Large tools comprise handaxes, a few cleavers, choppers and spheroids and tools, included micro-choppers, polyhedrons, discoids, side-scrapers, beaks, burins, end-scrapers, denticulates, notches, and points.

The excavation confirmed that the Acheulian industry represented a primary occupation along lake-shore and pool environment.

66. Exploration in District Pali.— During the course of his exploration Rajeshwar Pathak of the Western Circle of the Survey, brought to light the following sites:

Taluk/Tehsil	Village/Site	Cultural Assemblage
Desuri	Alani	Medieval Siva Temple, *Sati* stone and inscription
-do-	Bagol	Medieval Jain temple, inscription and *Sati* stone
-do-	Bandar	Step-well, inscription and *Sati* stone
-do-	Bari	Late Medieval site
-do-	Bhandarlu	Medieval Siva temple, sculptures and inscriptions
-do-	Bardi	Late Medieval Siva temple and copper plate inscription
-do-	Dailana Kalan	Medieval Jain and Vishnu Temples, Dailana Kalan inscription and place
-do-	Dailana Khurd	Medieval Vishnu temple, inscription and *Sati* stone
-do-	Dharia	Medieval Vishnu temple and inscription
-do-	Dutharia	Medieval Vishnu temple, Siva temple, inscription and *Sati* stones
-do-	Ghanerao	Medieval Vishnu temple Jain temple sculptures, inscription, step-well and palace
-do-	Gurha-Maharam	Tank
-do-	Ghenari	Medieval Siva temple, sculptures, inscription and step-well,
-do-	Intdara-charnan	Early Medieval remains, inscription and *Sati* stone
-do-	Intdara-Metriyan	Medieval remains and inscription
-do-	Jawali	Medieval Jain temple, Vishnu temples Siva temple, inscriptions and step-well
-do-	Khinwara	Medieval Siva temple Vishnu temple, inscription and *Sati* stone
-do-	Kolar	Medieval Vishnu temple sculptures, step-well and inscription
-do-	Kot	Medieval Jain temple, sculptures
-do-	Magara-talao	Medieval site
-do-	Mewikalan	Medieval Siva temple, and sculptures and inscriptions
-do-	Nipal	Copper plate inscription and *Sati* stone
-do-	Panota	Step-well
-do-	Punaria Metriyan	Medieval Lakshimi-Narayana temple, sculptures and inscription
-do-	Raipura	Copper-plate inscriptions, step-well and *Sati* stone
-do-	Ranikalan	Medieval Jain temple, inscription and *Sati* stone
-do-	Sepatawa	Medieval temple

Taluk/Tehsil	Village/Site	Cultural Assemblage
Kharchi	Bagola	Medieval site
-do-	Deoli	Medieval Jain temple and inscription
-do-	Dhanla	Late Medieval remains and inscription
-do-	Dhundhla	Medieval Vishnu temple, inscription and *Sati* stone
-do-	Gurha Mehkaran	Medieval remains, inscription *Sati* stones
-do-	Halwat	Medieval remains and a fort
-do-	Isali	Medieval Vishnu temple and inscription
-do-	Januda	Medieval Vishnu temple
-do-	Jojawar	Medieval Siva temple, inscription, step-well and *Sati* stone
-do-	Kantalia	Medieval Vishnu temple, inscription, *Sati* stone and step
-do-	Karmal	Medieval remains, inscription and *Sati* stone
-do-	Mani	Medieval site
-do-	Panchetia	Copper-plate inscription, *Sati* stone, tank and palace
-do-	Ramsingh-Kagudha	Medieval Vishnu temple, inscription and *Sati* stone
-do-	Saran	Medieval Siva temple, sculptures, copper-plates, *Sati* stone, step-well and a palace
-do-	Sewaj	Medieval sculptures, inscription, *Sati* stone and a step-well
-do-	Sichana	Medieval Vishnu temple and inscription
-do-	Siriari	Medieval Jain temple, Siva temple inscription and *Sati* stone

TAMIL NADU

67. Excavation in Gutturmalai, Guttur, District Dharampuri.— The Department of Ancient History and Archaeology, University of Madras under the direction of K.V. Raman, assisted by A. Swamy, S. Gurumurthy, P. Shanmugam, A. Ekambaranathan, R. Ponnuswamy, A. Narayanswamy and R. Venkatesan conducted excavation of an ash-mound at Guntru-murthy, P. Shanmugam, A. Ekambaranathan, R. Ponnuswamy, A. Narayanswamy and R. Venkatesan, conducted excavation of an ash-mound at Guttur, Krishnagiri Taluk.

Trench GTR-1 (10 x 7 cm) revealed 10 layers interrupted by several pits (pl. 40) and yielded a rich variety of antiquities assignable from Megalithic upto the Modern time. On the basis of the pottery and other antiquities three cultural periods could be made out. Three Neolithic celts recovered from this trench and those from the surface do not suggest the clear existence of a Neolithic period. The following cultural periods were observed:

Period I	—	Megalithic	300 BC-200 AD
Period II	—	Early Historic and Early Medieval	200 AD-900 AD
Period III	—	Late Medieval and Modern	Ninth century onwards

A cultural sequence in the trench GTR-3 was similar to GTR-1. The structures exposed were three rooms partitioned by three cross walls. The remains were made of two to three well-aligned courses of large sized dressed stones. Rubbles and brick bats were found scattered nearby, suggesting a superstructture over the stone basement.

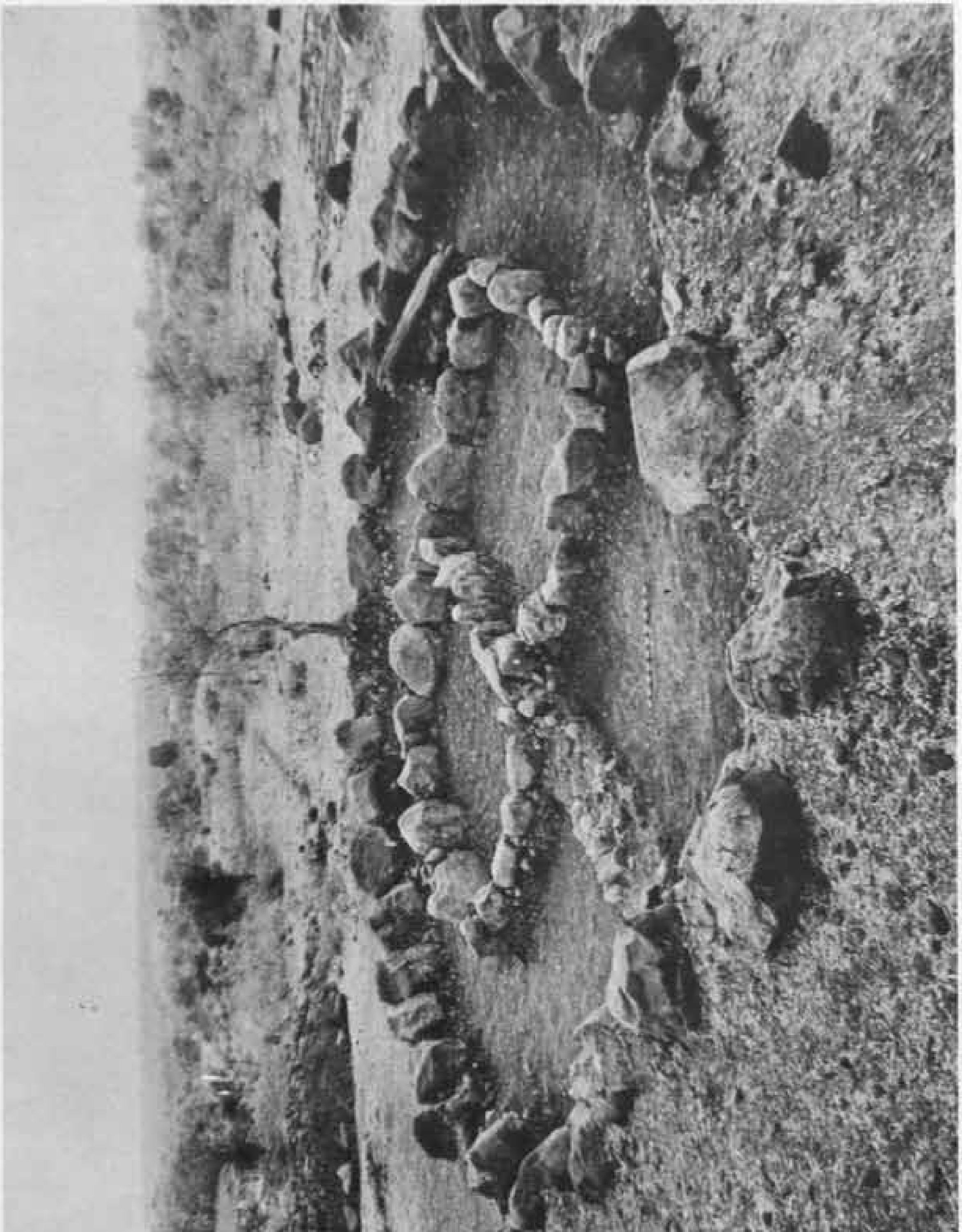
Trench GTR-2 was laid on the northern periphery of the mound which revealed 4 layers. The top two layers yielded coarse red ware, and on the red *murrain* floor-level underlying layer (2) were found groups of pottery vessels, both in full shapes and partly broken. The lower two layers yielded plenty of black-and-red ware, and fine red-slipped-ware, suggesting the possibility that Megalithic people were the earliest occupants of this site. A little farther east of GTR-1 was located GTR-3 and vertical digging therein was restricted to a limited area due to the exposure of a stone-structure-complex and the murram floor.

A trench at GTR-4 revealed elongated, oval shaped, trough-like terracotta objects recalling Megalithic sarcophagus partly exposed without the appendage. Eight such terracotta recepticles were exposed. Their walls were made of earth with an admixture of thick sand. The bottoms were plastered with hard and thick coating and the two apsidal ends were resulting in an arch shape. The ends on either side perhaps serve as a stable footing (symbolic legs). Not a single piece of bone or other traces of funeral objects were noticed. But several pieces of terracotta pipes, with iron encrustation, and a large quantity of iron slags were invariably found. Iron slags were a common phenomenon.

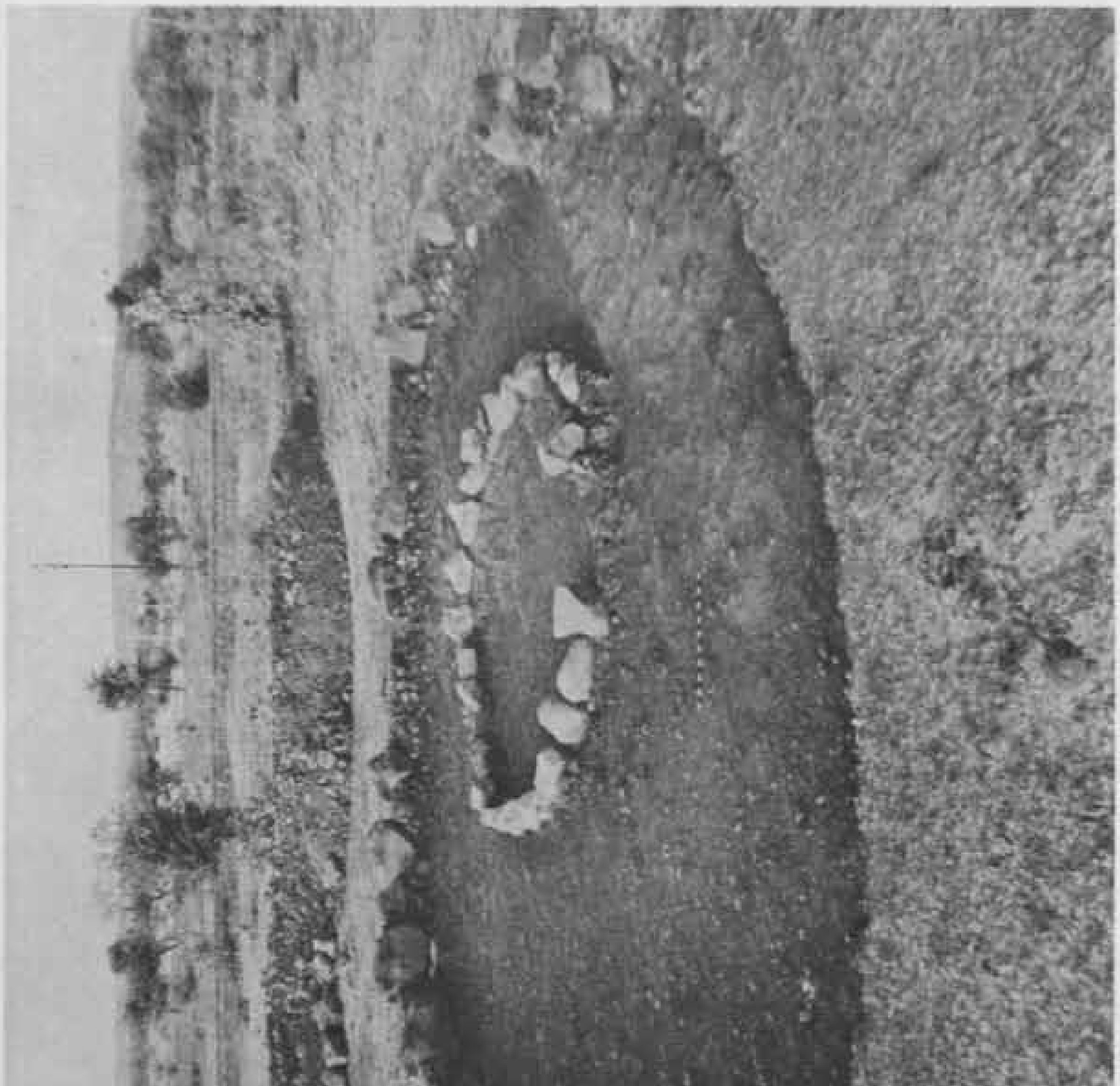
The absence of funerary object and the occurrence of numerous pipes and iron slags suggested that the trough-like objects might have served as furnaces for iron smelting and casting.

68. Excavations at Kambarmedu, District Thanjavur.— C.L. Suri assisted by P.N. Babu and P.R.K. Prasad of the Southern Circle of the Survey, undertook excavation at an ancient mound popularly known as '*Kambarmedu*' in the village Terazhandur. The excavations revealed that the site was occupied by the early Megalithic people with late Neolithic remnants, followed by the Medieval period.

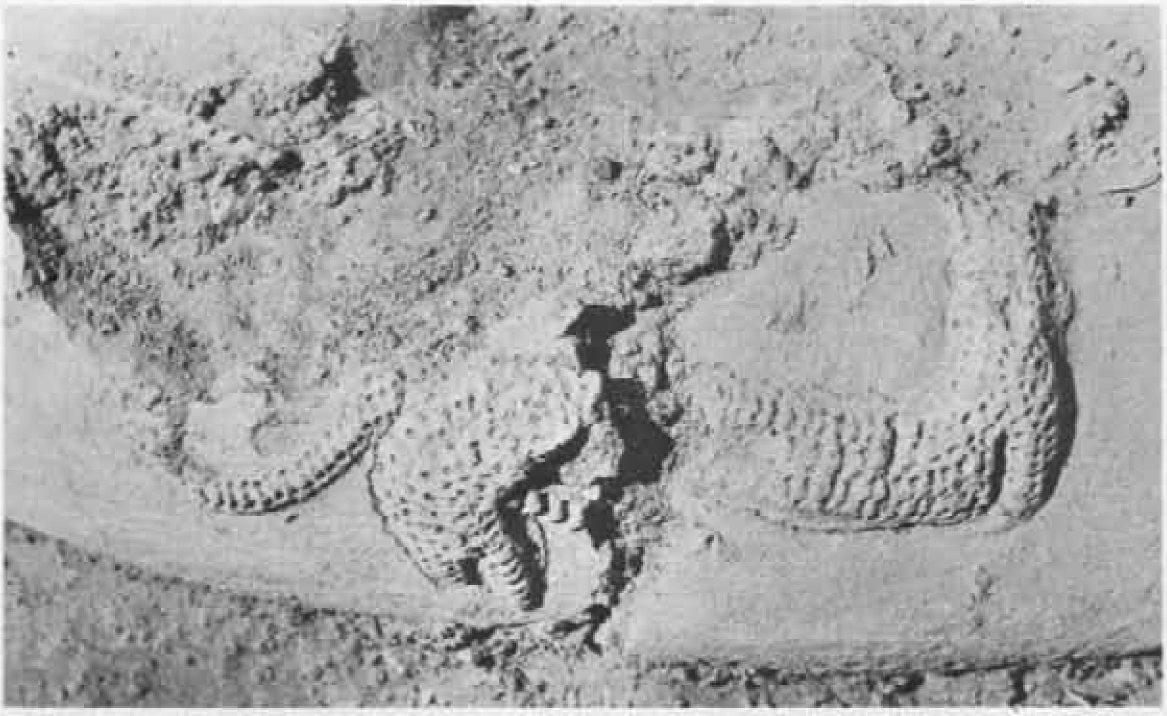
The lowest period at this site was the Megalithic. The early levels yielded pottery of black-and-red ware and the associated pottery red ware. The red ware consisted of both slipped and unslipped varieties. The typical Megalithic shapes found were everted rim, cari-nated bowl and pot with a bulging body. Some of them bore paintings in red bands. The pottery was too fragmentary. Apart from red ware, both hand-made and wheel made pottery was encountered in this phase along with a fragment of Neolithic axe. A rolled handaxe was also found in the early levels. The late Megalithic period yielded pottery of black-and-red ware



34. Bhagi Moharia stone circle with chamber passage.



35. Bhagi Moharia stone circle with a smaller circle within it.



36. Inamgaon panther with prominent organ.



37. Inamgaon skeleton with missing limbs.



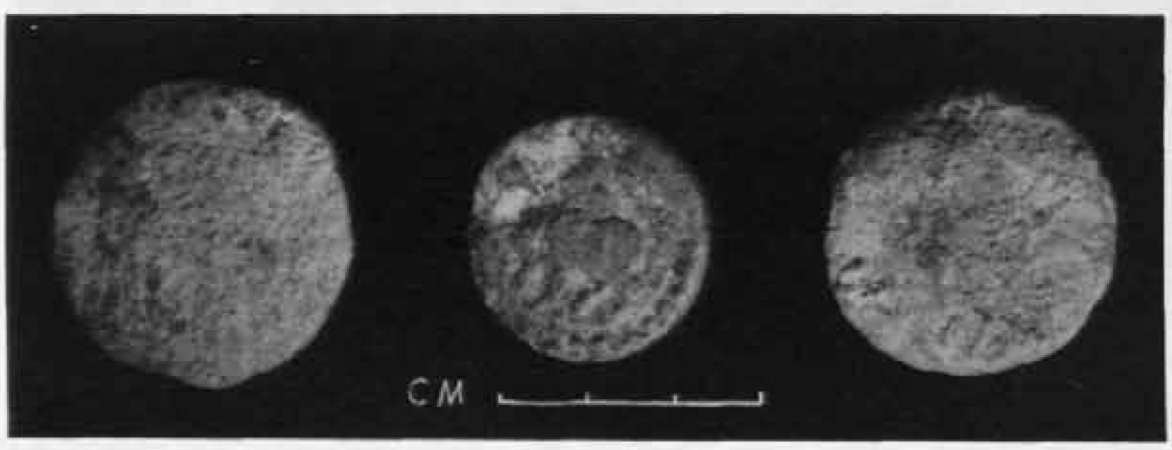
38. Rohira house complex in trench E-6.



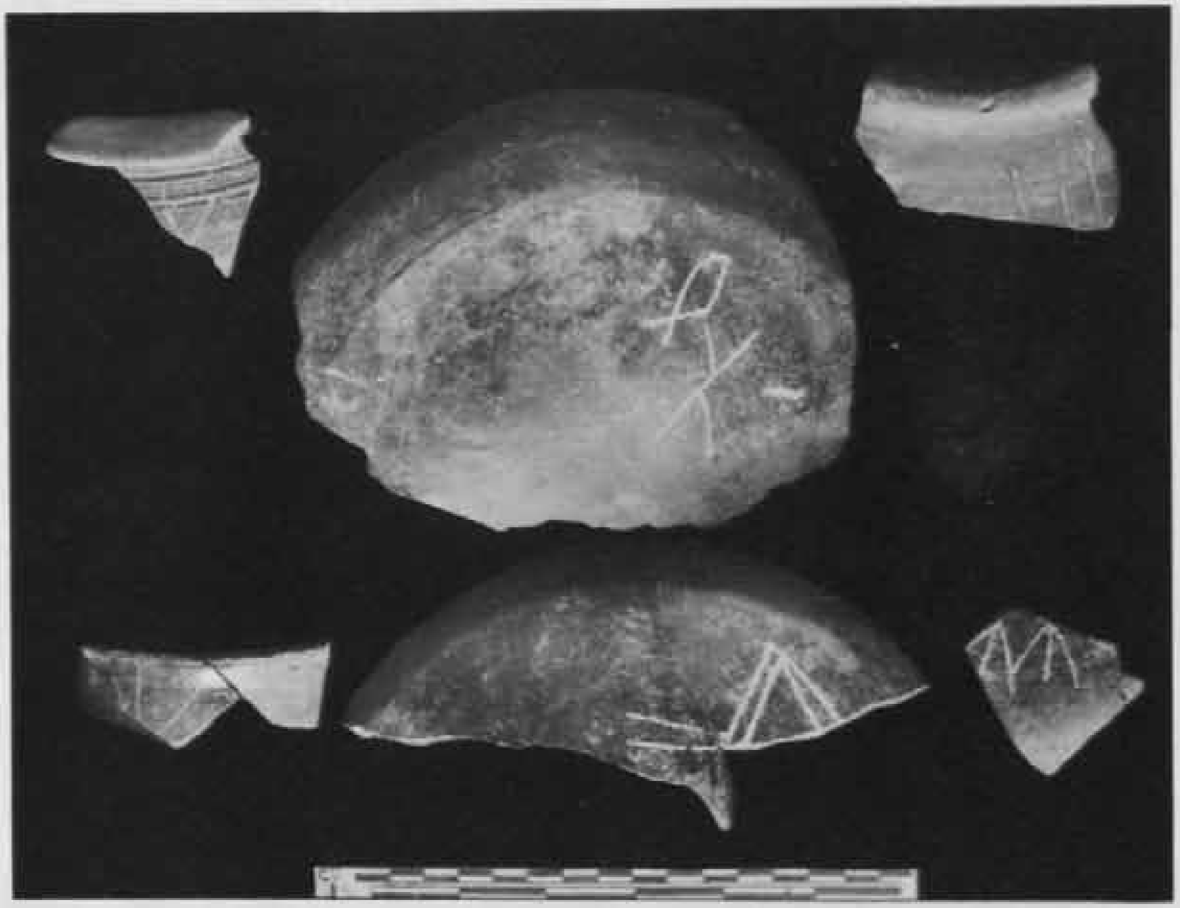
39. Rohira terracotta sealings.



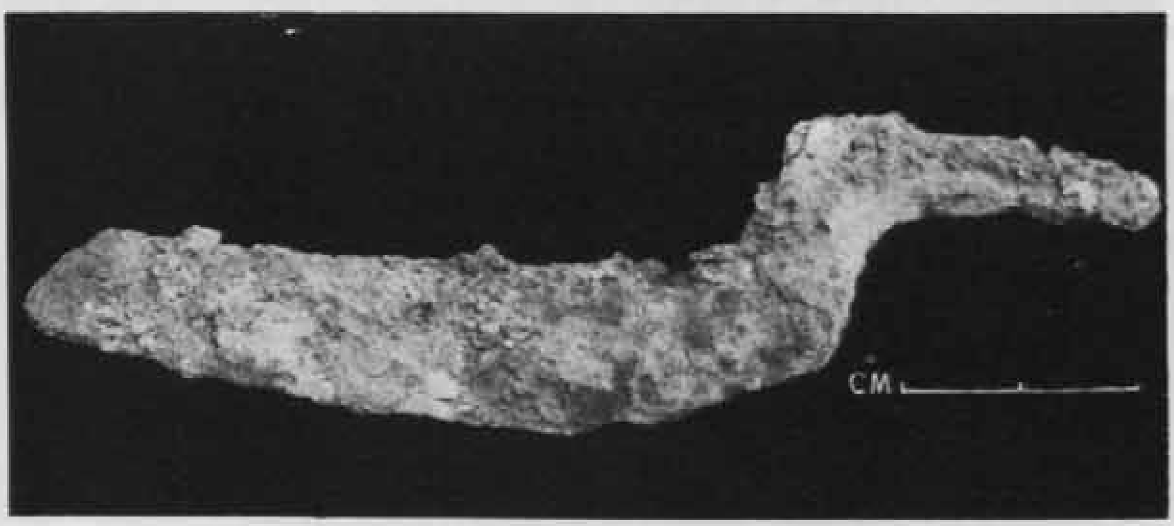
40. Rohira Guttur: exposed section at GTR-1.



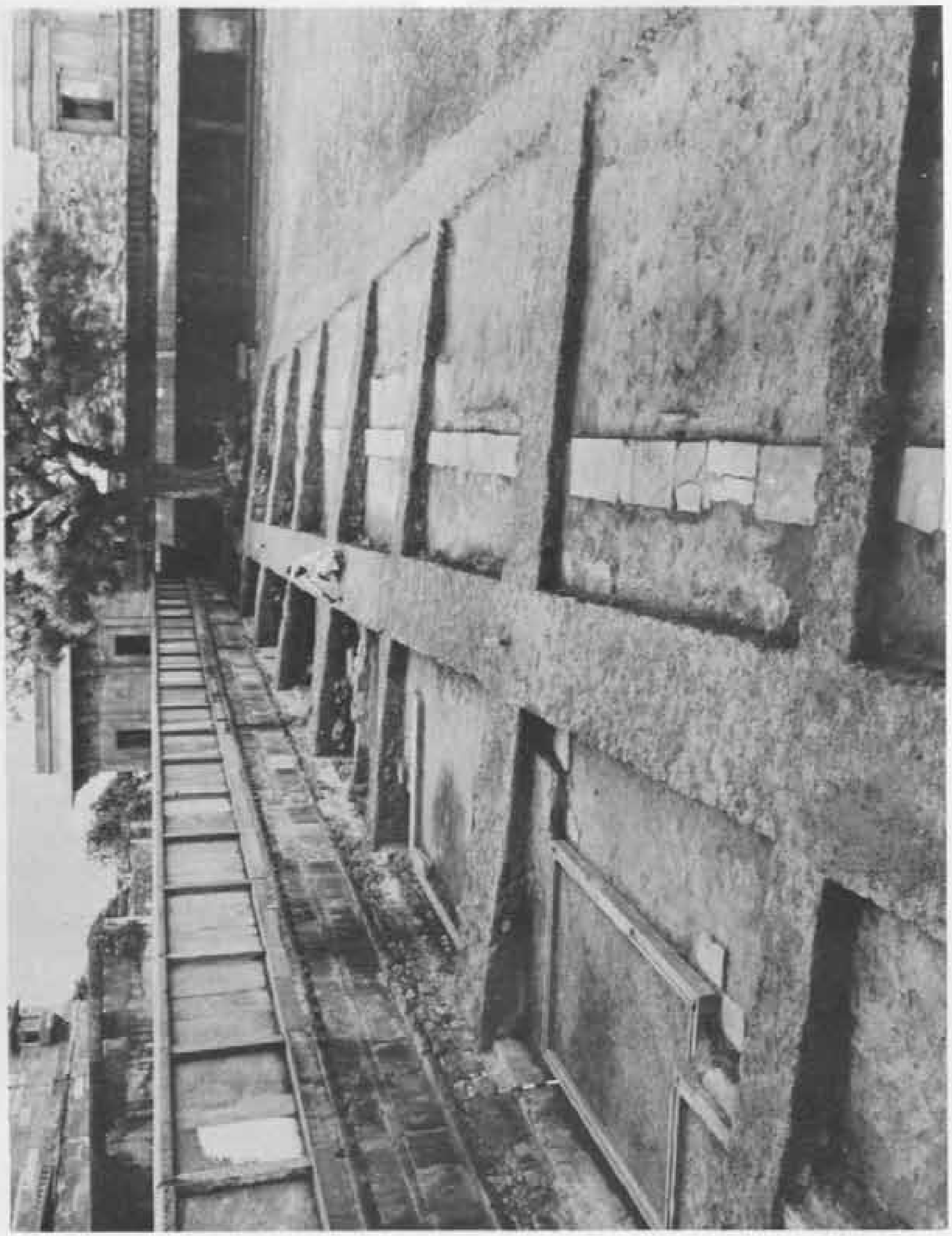
41. Kambarmedu copper coins.



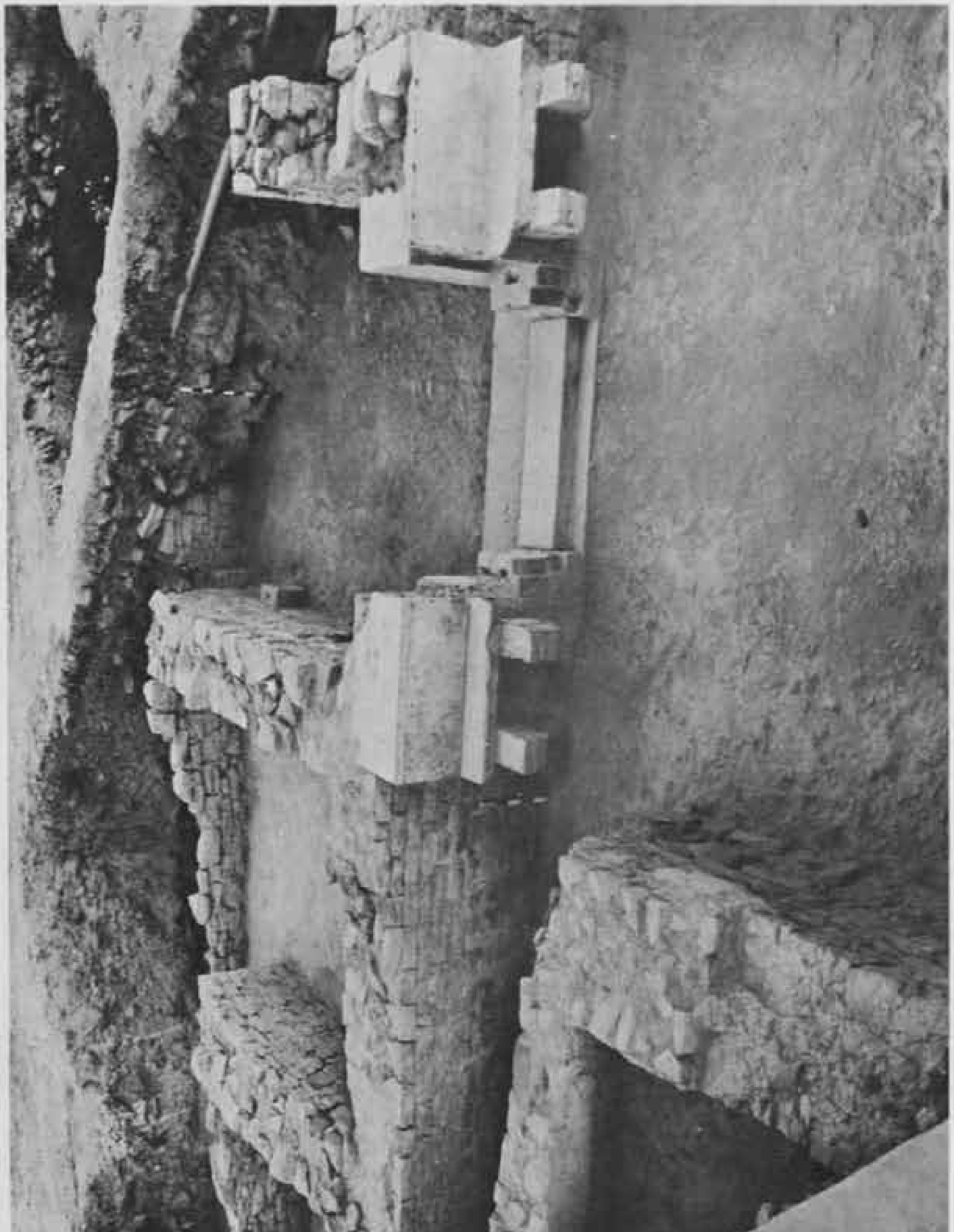
42. Kambarmedu graffiti marks on sherds.



43. Kambarmedu iron sickle.



44. Fatehpur Sikri structural remains.



45. Fatehpur Sikri a house complex.



46. Bharadvaj Ashram seals.



47. Bharadvaj Ashram scalings.



48. Bharadvaj Ashram sealing.



49. Sringaverapura southern part of the tank.



50. Sringaverapura terracotta Hariti.



51. Sringaverapura gold coin.



52. Sringaverapura terracotta seals.



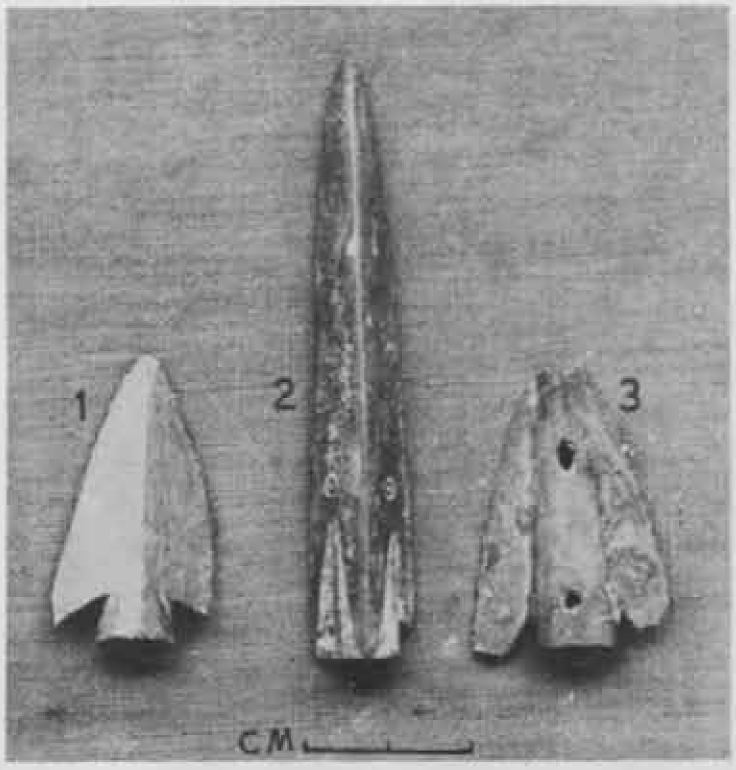
53. Sringaverapura terracotta sealing.



54. Sringaverapura terracotta seals.



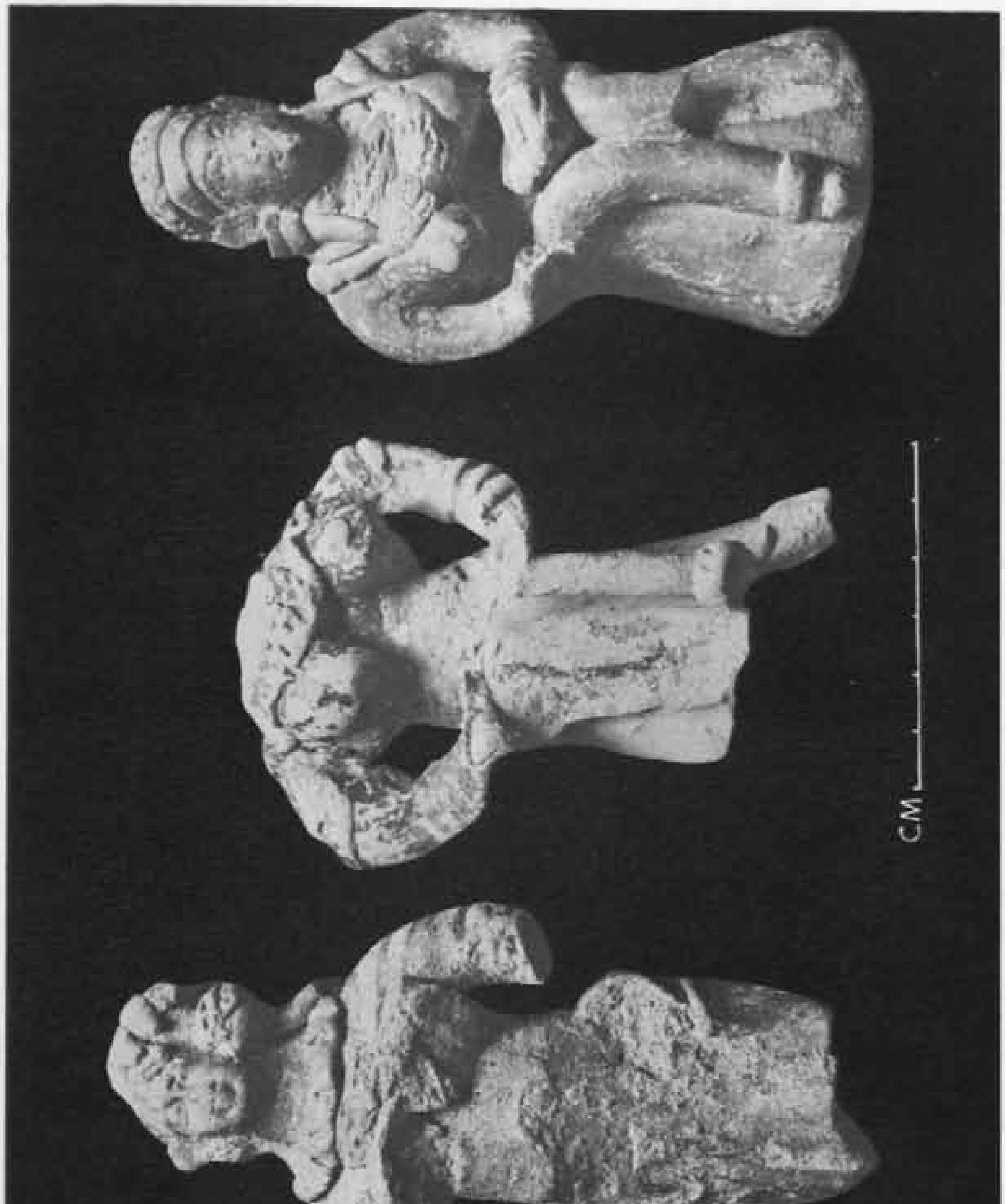
55. Kheradih exposed road.



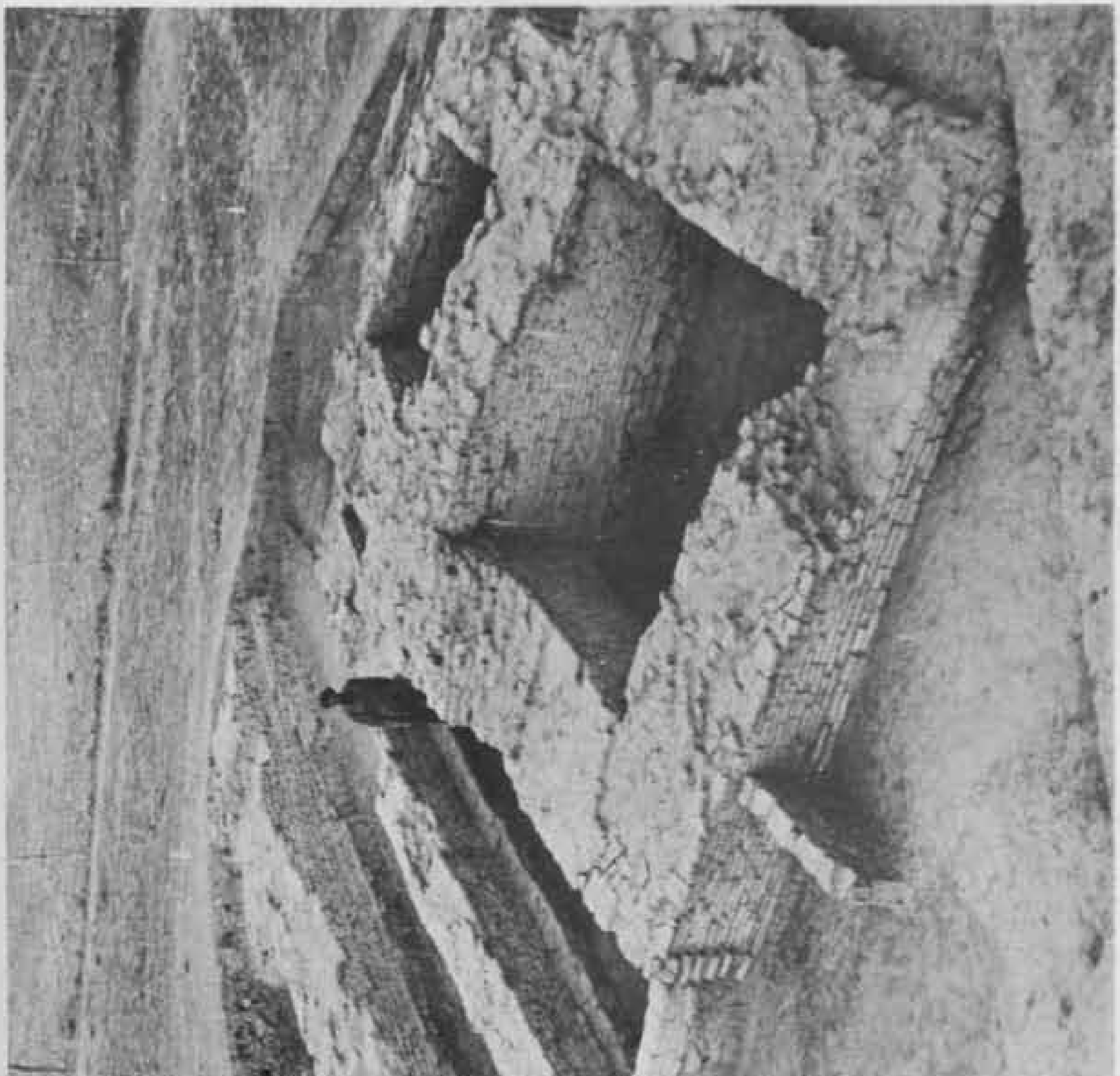
56. Kheradih arrow-heads.



57. Kheradih clay sealings.



58. Kheradh terracotta human figurines.



59. Moradhwaj excavated brick temple.

and other associated red-ware with graffiti marks (pl. 42)

The other notable antiquities recovered were terracotta objects, beads of semi-precious stones in a large quantity, shell bangles, iron sickle, (pl. 43) and nails.

The site was reoccupied after a gap. The vestiges of the Medieval period were represented by floor levels, brick walls, burnt pits, and pottery of dull red ware in abundance. The main types of the dull red ware pottery were globular pot, carinated vase, bowl with flaring and flat base. The antiquities encountered were terracotta objects, plumb-bob, ear-ornament, beads, pendants and Hopscotches; bangle pieces of glass and shell, iron objects, and copper rings. The beads were of varying sizes and shapes and made of glass, paste, soap stone, and semi-precious stones like coral, carnelian, agate and steatite, and coins of the Chola period (pl. 41).

UTTAR PRADESH

69. Excavation at Fatehpur Sikri, District Agra.— In continuation of last year's work *(1981-82,* pp. 63-66) excavations were resumed under the joint collaboration of the Survey and the Department of History, Aligarh Muslim University. The University team directed the excavations under R.C. Gaur assisted by J.M. Siddiqui, K.K. Mohammad, Sami Alam, Nasir Husain Zaidi, Mohammad Anis Alvi, Mohammad Abid, and Q.S. Usmani.

The place which was known as the *ibadat khana* (hall of worship) on the basis of literary references and a painting of Akbar Nama yielded encouraging results. Formerly, it was the cell of Shaikh Abdulla Niazi Sirhidi who was a disciple of Sheikh Salim Chishti. On his joining the Mahdhavi sect this building was converted into the *ibadat khana.* The excavation revealed a boundary wall made of rubble and lime mortar, measuring 48 sq. m. A *quanati masjid* (Qibla Masjid) with five arches was on the Western side, of which the three were extant. The 'Allah' was written in Arabic in stucco plaster, on both sides of the spandrels of the arches. Above this, there were decorated mouldings and beautiful interlocking tulips picked out in white.The northern side was with a number of rooms. On the eastern side there were steps each measuring 2.40 x 1.70 m through which the participants had their access to the buildings. These steps were made of rubble and lime mortar.

The main building in which Akbar used to sit along with the leaders of various religions was made of rubble and plastered with lime. It was a pyramidal structure of three terraces diminishing in size. The lower one measured 21 sq. m. and with two steps giving access to the second terrace. This might have been supported by a pillared verandah. The second terrace measuring 13.35 sq. m. had also a pillared verandah, the remains of pillars and on which the king used to sit and preside over the debate had two fallen brackets amply proved it. The third terrace was with two rooms, the eastern one was well-plastered and measuring 4.65 x 2.90 m whereas the western room had a door and was used perhaps by the king as ante-chamber.

The excavations on the southeast and eastern sides of the *Shabistan-e-Iqbal* (popularly known as Jodhabai's Mahal) revealed remnants of a 90 m wide wall running east-west in direction. It provided an access to the palace complex by 1.5 m wide stone-paved gate. Possibly this wall was the part of an original boundary-wall of the main palace complex. The

excavation also revealed remains of interesting structures (pl 44) cloistered verandah and remains of seven rooms of varying dimensions, probably of a later date.

The excavation in the year 1981-82 had established that the present road dividing the records office and *Khwabgah* did not exist during Akbar's time and there was no entrance from the eastern side.

At the southeastern side of the *Shabistan-e-Iqbal* (Jodhabai's Mahal) a massive and beautifully designed house complex (pl. 45) of seven rooms was also exposed. However, its exact purpose is not known.

Trenches laid in the vicinity of Chandrapole brick structures of the later period were also exposed. These were probably house-remains of common people.

70. Exploration in District Agra.— C.P. Singh of the Northern Circle of the Survey, discovered Painted Grey Ware at Inayatpur.

71. Excavation at Bhardvaja Ashram, District Allahabad.— In continuation of the previous year's work (*1981-82,* pp. 66-67), the excavation was taken up under the National Project Archaeology of the Ramayana Sites'by the Excavation Branch-II of the Survey, in collaboration with the Indian Institute of Advanced Study, Simla. The work was directed jointly by B.B. Lal of the Institute and K.N. Dikshit of the Survey assisted by P.K. Trivedi, L.S. Mamani and Jamal Hasan of the Survey. The uppermost layer of 30-40 cms constituted humus and, recent deposits were removed. Two main periods of occupation were observed, the upper one from the Gupta period and the lower one from the black-slipped-cum-N.B.P. period.

There were two structural phases in the Gupta period. The upper phase was with a large flooring of brick-bats enclosed by peripheral walls. In the lower phase, one of the flooring with complete bricks (39 x 23 x 5 cm) was found. From this period an inscribed seal (pl. 46), quite a few sealings (pl. 47, 48, B and C), terracotta figurines and pottery were found. Of these particular attention may be drawn to a sealing bearing the figures of Ganga and Yamuna, with an inscription underneath. Though the inscription was not fully legible, one may read the word *paramabhattaraka* and in the second line towards the end, *adhikarana.* Evidently, therefore, the seal was an administrative one. From this level were also yielded several copper and iron objects.

Underlying the Gupta period was found abrupt change in the pottery, the black-slipped-ware and sherds of the Northern Black Polished Ware. The deposit containing these wares differed in their nature from that of the Gupta period. There were no bricks and floor deposit. However, some post-holes alongwith reed-impressions were found. Most of the sherds from this layer were corroded but a few of them shine like N.B.P. A few pieces of black-slipped-pottery with stamped decoration need special mention

72. Excavation at Chopani-Mando, District Allahabad.— B.B. Misra, J.N. Pandey and M.C. Gupta, of the Department of Ancient History, Culture and Archaeology, University of Allahabad, undertook the excavation with a view to understanding the settlement plan in the

last phase. Three trenches measuring 5 x 5 m were dug upto a depth of 30 cm.

Excavation brought to light a number of occupation floors and a few irregular circular or oval stone pavements. The occupation floors were either circular or oblong and were characterised by a large number of stone rubbles. Microliths, chunks, hammer-stones, querns, grinding stones, ring stone, circular disk, soap stone bars, pot-sherds (hand-made) and animal bone fragments, were found on these floors. The presence of burnt-clay lumps with reed and bamboo marks and a few post-holes generally along the periphery and some in the centre of these occupation floors, suggest that the settlers used to live in huts. On the periphery of some of the floors were noticed huge stone blocks.

73. Excavation at Mahagara, District Allahabad.— The Department of Ancient History, Culture and Archaeology, University of Allahabad, undertook an excavation with a view to ascertaining characters of Gravel IV at the site. A trench 1 x 5 m was laid out upto a depth of 2 m. The excavation revealed that Gravel IV was very similar to Gravel III, except it was comparatively loose. The excavation yielded a few flakes, fragmentary shells and bone pieces.

74. Excavations at Sringaverapura, District Allahabad.— In continuation of the previous year's work (*1981-82,* pp. 66-67), the excavations were resumed under the National Project 'Archaeology of the Ramayana Sites', by Excavations Branch-II of the Survey in collaboration with the Indian Institute of Advanced Study, Simla. The work was directed jointly by B.B. Lal of the Institute and K.N. Dikshit of the Survey, assisted by P.K. Trivedi, R.S. Sharma, S.K. Sharma, L.S. Mamani of the Branch and S.K. Srivastava and K.K. Grover of the Institute. The main objectives of this season's work were to obtain further details of the tank-complex.

Two retaining walls, viz. the lowest and the one above it, were found on the western side, opposite the area where a brick-on-edge ramp had been exposed earlier. The lowest levels of the tank were struck with greyish- white fine silt alongwith pottery, other antiquities and fresh-water shells.

The details of the steps adjoining the eastern walls were obtained 50 m south of the ramp. Four successive retaining walls were brought to light near the southern end of the tank-complex (pl. 49). Though the walls were damaged to a considerable extent, the south-eastern corner was undamaged. In the southwestern part, the two lower retaining walls were found to turn southwards, thus producing a kind of channel, measuring 4.40 m in width. Between the lowest retaining walls and also partly overlying them there was the black silt with occasional sandy bands which were found to cover the entire tank-complex of Phase I. Details of the tank-complex further to the south can be ascertained after further excavation.

A little away from this tank-complex, in the northeastern part was found a large house-complex, the western most outer wall of which was almost parallel to the retaining walls of the Tank B. The pottery found in this area was similar to that obtained from the tank-complex, a fact suggesting the contemporaneity.

The tank-complex yielded, besides pottery, many terracotta figurines (pl. 50). These were assignable to the period around the beginning of the Christian era. After the tank-complex had

gone completely into disuse, there came up in the southern area a prominent house-complex, which had atleast three structural sub-phases. The lowest of these, was associated with the late Kushan gold coin (pl. 51). The layers contemporary with the house-complex and the underlying layers yielded seals and sealing ascribed to the period around 3rd century AD (pl. 52,53, 54 B, C, D).

75. Exploration in District Allahabad and Mirzapur.— A team of the Department of Ancient History, Culture and Archaeology, Allahabad University, in the course of exploration discovered the sites ranging between Lower Palaeolithic to Megalithic period.

Lower Palaeolithic artifacts were found at Baburahia and Patehari situated on Seoti and Taradaha on the Belan valley. The assemblage comprised of handaxes, cleavers and flakes made on quartzite and sand stone.

Middle Palaeolithic artifacts comprising flakes and scrapers and a few animal fossils were collected at Daiya, Taradaha and Baraundha.

Ayodhya, located on the Belan yielded Neolithic celts along with microliths. From Taradaha, Galdahawa, Amilia, Khajuri Khurd, in the Belan and Pipraon and Bahraicha in the Lapari valley yielded a Neolithic assemblage comprising polished celts, corded and rusticated ware, bone arrow heads, microliths and hammer stones.

Chalcolithic black-and-red ware alongwith ring stones were collected in the Seoti valley. The Kotia type material comprising pottery and a few iron objects of the Megalithic period were collected at Kaithwal, Baghol and Tundiyari in the Lapari valley and Khajuri Kala, Raja-pur, Amilia and Pipraon in the Belan Valley.

76. Exploration in District Baharaich.— H.K. Narain of the Mid-eastern Circle of the Survey, located three ancient mounds denoting an ancient township in Nanpara Tehsil along with a broken stone image of seated Durga, standing female and male deities, and red and glazed ware belonging to late Medieval period. Other finds included a raw iron lamp, and copper coins belonging to Akbar. He also located one *Ekmukh Shivalinga* in Isapur village.

77. Excavations at Kheradih, District Ballia.— In continuation of the previous year's work (1981-82,. pp. 67-70) the Banaras Hindu University, under K.K. Sinha and Birendra Pratap Singh, assisted by Ravindra Kumar, Ajay Srivastava and S.C. Singh Rana, resumed the excavation with a view to understand the Kushana township and the stratigraphy at the site. This year's work brought to light a deposit of only three successive cultural periods.

The strata belonging to Period I was 1.95 m thick. The pottery of this period consisted of plain and painted varieties in black-and-red ware, black slipped ware, and slipped and unslipped red ware. This year's work brought to light the black ware as distinct from the black slipped ware. The importance of its occurrence lies in its possible link with the black burnished ware which is commonly associated with Neolithic assemblage.

The three season's work revealed that Period I was devoid of iron. The use of copper was

attested to as evidenced by the occurrence of a solitary socketed arrow-head having two perforations. Among other notable finds of the period mention may be made of a micro-bead of blue glass, socketed arrowhead of bone (pl. 56) and a large terracotta figurine, most probably of an animal.

Period II, with the maximum thickness of 2.88 m was characterised by the occurrence of the N.B.P. and its associated wares. The N.B.P. sherd revetted with a copper pin, painted N.B.P. and grey ware sherds bearing painting in black were recovered. Two uninscribed cast coins of copper, a silver coin and a copper punch-marked coin were found from this period. A goldsmith's touch-stone of black basalt with test marks of gold on both sides was recovered in the upper levels. Beads of carnelian, quartz, agate, ivory, basalt and copper red glass, a jasper weight, casket lids, terracotta human figurines in typical Sunga style, a terracotta, a bladelet of chalcedony, a copper ring, and a copper amulet, were the other finds from both early and late phases. On the northern side, a floor made of rammed brick jelly and pot-sherds was recovered in an extensive area. A large sized hearth oriented north-south was also found on the edge of the floor on the eastern side.

In Period III, the road, which was exposed in the last season, was further traced (pl. 55). The total length of the road traced so far was 45/46 m. It had its turning on the northern side of the mound. The width of this subsidiary road oriented north-south too was not uniformly maintained throughout its exposed length of 18.60 m. As a result of further work to the east, of the subsidiary road, two small sized lanes were brought to light. They were found running in east-west directions and interconnected with the subsidiary road oriented north-south. They can be regarded as service lanes for the houses standing on both the sides. It was noted that when the lanes and the subsidiary road fell into disuse, they were blocked by erecting walls in the passage at different intervals. No such blocking was found in the case of the main road. Thus, the main road was in continuous use from its origin, while the subsidiary road and the two service lanes were of shorter duration. Due to extensive disturbances by brick robbers, the complete length of any lane could not be obtained. However, lane 1 which finally joined the subsidiary road near its northern end was traced upto a length of 1.34 m and its maximum width 1.39 m and 0.60 m was noted respectively on the eastern and western end. Lane-2 was situated further to the south of lane 1 at the distance of 7.32 m. The width was uniform (0.75 m) through out its traced length (6.40 m).

An extension of the excavation to the north of the main road brought to light remains of several residential buildings standing on both sides of the subsidiary road and lanes referred to above. A house consisting of two rooms with an open verandah in front and a drain measuring 6.82 m from east to west and 7.10 m from north to south was also found attached to it, running throughout the back side of the house and finally discharging on the northern side.

Very close to the drain of the house was found an underground structure measuring 2.04 x 1.68 m. The walls of the structure tapered downward and measured 1.40 x 1.08 m at the base. The structure was built in two phases and probably served as a part of the house during phase I. The whole house complex including an underground structure was enclosed by a boundary wall. Immediately to the south of the underground structure, remains of another house consisting of two rooms were found. Further east of the house referred to above,

another house built in north-south alignment and consisting of three rooms was found. In one of the rooms was located a well with a diameter of 93 cm. It was built of wedgeshaped bricks. The house and the well appeared to be contemporary. Remains of other residential houses were laid bare to the south of the lane 1. Mention in this regard may be made of three rooms built in a row with a verandah in front. The three rooms measured 2.02 x 1.76 m, 2.03 x 1.78 m and 3.08 x 2.28 m. The last room was provided with a drain on the eastern side. Later, when the drain fell into disuse it was sealed by a brick flooring as evidenced by its fragmentary remains. Further on the western direction of the same room an underground structure of small dimension measuring 1.50 x 0.86 m was also found. It was 1.45 m deep. It appeared that the two rooms and the verandah of the house might have been used for living purposes and the remaining one for storage purpose. Adjacent to it, the remains of two separate rooms measuring 2.10 x 2.08 m. and 2.10 x 2.0 m were found, suggesting thereby the existence of one or more house-complexes. Further, remains of the houses of varying sizes were found to the east of the subsidiary road and south of lane 2. An underground structure for storage, measuring 1.07 x 0.94 sq m assignable to third—fourth century AD was also found.

Amongst the finds, mention may be made of a copper coin of Kanishka with the legend in Kharoshti script, several terracotta sealings (pl. 57) with the legends *Yamasa (e) nasa, Dhruvadasya (f) Shv (T) laya (sa) Rudradattasya, Mitimatasya,* etc. in the script of first-third century AD. Other notable finds of the period comprised silver and gold-foiled beads of glass, terracotta human figurines (pl. 58) of typical Kushana style and revealing foreign ethnic features. Mention in this regard may be made of two terracotta female figurines shown seated on a stool, bedecked with ornaments and two male figurines shown with beard and moustaches. Besides, several human heads depicting distinctive hair styles have also been found. Copper objects, such as bell, *nupura,* pots, pans and antimony rods, and an iron axe and a chisel were recovered.

78. Excavation at Moradhwaj, District Bijnor.— The Department of Ancient Indian History, Culture & Archaeology, Garhwal University, resumed (*1970-80* p. 75) the excavation at Moradhwaj, under the direction of K.P. Nautiyal, assisted by D.L. Rajput, Ramesh Khan-duri, B.B.S. Rawat, J.S. Negi and P.R. Semwal. Besides imparting field training to the M.A. students of the University, the main objective was tracing the extension of the Kushana temple complex.

This year's excavation revealed the strong foundation of the temple. The upper portion of the temple appeared to have fallen long before. The temple was (pl. 59) rectangular (9.7 x 6.7 m) in shape with a sanctum (2.2 sq m) and *amandapa.* The average width of the sanctum wall was 1.30 m while that of the *mandapa* was 1.55 m. The inner portion of the temple was exposed up to a depth of 2 metres covering at least 30 courses of bricks. The bricks used in the temple vary in size from 32 x 21.5 x 6 m to 31.5 x 20 x 6 cm. The significant aspect of the temple was a 1.30 m circumambulatory path *(pradakashinapatha).* Another significant aspect of this structure was that it was divided from a residential complex on the left. A rectangular (1.50 x 2 m) room was also unearthed.

Another site designated as MRD-7 was taken up for excavation to understand the position of the stupa. The excavation revealed the existence of a 72 m brick wall laid out in east-west direction. This wall was exposed up to a depth of 1.10 m covering at least eleven courses of bricks. The size of the bricks was normally 36 x 25 x 10 cm. The orientation of this wall in all likelihood suggests that it was nothing but a stupa of the Kushana period and the entire stupa still intact was now a huge mass of debris on top of which is located a modern Siva temple. The excavation unearthed about 23 terracotta Buddha plaques (7 x 4 cm) in which the Buddha has been presented in the *Jnanamudra* posture. These plaques were probably studded around the wall of the stupa.

Other important finds were terracotta beads, balls, bangles, cone, toy, copper bangles, antimony rod and iron implements, all belonging to the Kushana period.

79. Exploration in District Bijnor.— During the course of exploration in Tehsil Najibabad, under the village to village survey scheme, Vinod Kumar of the Northern Circle of the Survey, discovered ochre coloured pottery at Humayunpur Iddu; Painted Grey Ware at Budgara, grey ware at Bhagwanpur, Budgara, Ghosipura Khera, Ganguwala, Jiwalilala, Mathurapur Mor, Nakipur Bamauli and Sikandra Basi, and red ware of Medieval period at Bakarpur, Bhag wanpur, Budgara, Ghosipura Khera, Guladwalee, Husainpur, Humayunpur Iddu, Jiwalilala Qutbpur, Ghosipura Khera and Jafrabad.

Brick temples of the Medieval period were noticed at Bijar Khatta, Bakarpur, Jalalabad Manpur and Rampur; mosques of the Medieval period at Banehra, Husainpur and Marakpur Saharan; a Medieval tomb at Banehra, and Sati Burj of the late Medieval period at Ghosipura

80. Excavation at Malari, District Chamoli.— A preliminary exploration followed by a trial excavation was conducted by K.P. Nautiyal and assisted by D.L. Rajput, Rakesh Bhatt and J.S. Rawat, of the Department of Ancient Indian History, Culture and Archaeology, Garhwal University, Srinagar. The site of Malari is located in the inner Himalayan Zone at a height of 4000 m above MSL and 60 km north-east of Joshimath. These cave burials were dug on the soft calcareous limestone mountain by the protohistoric settlers of the region, primarily for burying the dead. It was found that the cave was oval in shape with an entrance of 1.15 m height, on the western face of the mountain, the width of the inner portion was 3 metres. At the entrance to the cave burial, a few large boulders were kept to block the passage.

The excavation yielded a complete skeleton of a horse oriented in EW direction. The other associated funerary material included red and black ware jars. The rich repertoire of pots (pl. 66, 67) showed linear, geometrical and, incised designs besides decorative handles occasionally from two sides. A red ware vase was painted with black flowing wavy designs on the neck portion and grooved geometrical lines on the body portion. Inside the cave, along with the skeleton a big storage jar in grey ware, highly fragile iron arrow-heads and a few bone arrow-heads were also recorded.

This cave burial at Malari can be tentatively assigned a date around 1000 BC.

81. Excavation at Bharat Mandir, District Dehra Dun.— The Department of Ancient Indian History, Culture and Archaeology, Garhwal University, carried out excavation at the Bharat Mandir under the direction of K.P. Nautiyal, assisted by B.M. Khanduri, Vinod Nautiyal, D.L. Rajput, Ramesh Khanduri, B.P. Badoni, S. Negi, H.C. Gairola, J.S. Rawat, B.B.S. Rawat, J.S. Negi and P.R. Semwal. The purpose of the excavation was to ascertain the early history of the temple of Bharat Mandir.

The excavation in general, established the beginning of the occupation of the site roughly in the second century BC continuing till the twelfth century AD with an intervening gap of three hundred years. The excavation revealed three occupational periods.

Period IA was characterized by use of crude N.B.P. ware, unpainted grey ware along with a thin glossy red ware from second century BC to first century AD. These people used burnt bricks for their houses. No sizeable traces of wall were found. The bricks used for the construction were 40 x 25 x 5 and 40 x 25 x 7 cms in size.

Period IB was marked by the structural evidence of the Sunga-Kushana period. The bricks used belong to following sizes: 24 x 22 x 7 cms, 23 x 1 2 x 6 cms and 22 x 1 5 x 6 cms. The structural remains were walls and floors. The floors were primarily made of bricks, but in some cases brick jelly was also used. A complete house having rooms, a kitchen and a bathroom was also discovered. The remains of drains and soakage-jars from this level typically resemble with the remains of historical sites of northern India. The main pottery was red ware which is well comparable with the Sunga-Kushana pottery from the other excavated sites in northern India.

Other important finds of this period were copper bangles, antimony rod, ear-rings, iron implements, terracotta balls, beads, hopscotch, decorated discs, spinning wheel and carnelian beads.

Period II was reoccupied in eighth century AD after a gap of about three centuries or more and continued for about four hundred years. Houses were built of burnt bricks and also by reusing bricks of the earlier period. The pottery was similar to the late levels at Ahichchha-tra and Hastinapur. The significant type was the knife-edged bowl. Other important finds were the copper coins, bangles, iron implements, glass bangles, beads, terracotta balls and bangles. This period was marked by the discovery of three Sultanate copper coins, demarcating the end of the site during twelfth century AD.

82. Exploration in District Deoria.— Sunil kumar of the Mid-eastern Circle of the Survey, in the course of his explorations discovered two stone images of Surya belonging to the Gupta period and an ancient mound yielding red ware and grey ware in Chhant village.

83. Exploration in District Etawah.— During the course of his exploration, G. A. Qamar of the Northern Circle of the Survey, discovered red ware treated either with red wash or with red slip at Akbarpur Danda and grey ware, red ware with red slip, and plain red ware of the Medieval period at Chapta. Brick temples of the Medieval period were noticed at Bahadurpur Uncha, Nawada Mamrezpur, and Patti Nam.

84. Exploration in District Ghazipur.— Indu Prakash of the Mid-eastern Circle of the Survey, in the course of his exploration discovered the remains of a fort, tombs and mosque in Zamania village.

85. Exploration in Districts Hardoi and Sitapur.— The Department of Archaeology, Government of Uttar Pradesh, under the direction of R.C. Singh assisted by Raja Ram Pal, Ambika Prasad Singh and Raj Kumar, conducted a exploration with a view to ascertaining the antiquity and historicity of *Naimisharanya Teerthkshetra.* During the exploration of *'Parikrama Marg'* and the surrounding region, the following sites were-discovered:

District	Village/Site	Ware and other associated finds
Hardoi	Ahiri	Medieval
-do-	Akghra	-do-
-do-	Ant	-do-
-do-	Arami	Sunga-Kushana and Medieval
-do-	Atra	Medieval
-do-	Bakshera	-do-
-do-	Banekviyan	-do-
-do-	Baoen	-do-
-do-	Barra Sarai	-do-
-do-	Bautha	-do-
-do-	Bhainsari	Sunga-Kushana and Medieval
-do-	Bheethadan	Medieval
-do-	Byourapur	-do-
-do-	Chausa	-do-
-do-	Dahi	-do-
-do-	Gaju	Gupta and Medieval
-do-	Gangai	Medieval
-do-	Gondaghar	-do-
-do-	Gondarao	Sunga-Kushana and Medieval
-do-	Gondarao Bazar	Medieval
-do-	Gursanda	-do-
-do-	Hans Barauli	Sunga-Kushana
-do-	Hariharpur	Medieval
-do-	Jagrauli	-do-
-do-	Jakhanv	-do-
-do-	Jamuniha	-do-
-do-	Kabulpur	-do-
-do-	Kalaam	-do-

District	Village/Site	Ware and other associated finds
-do-	Khanrakhera	-do-
-do-	Kotara	-do-
-do-	Mahinkur	-do-
-do-	Mampur	-do-
-do-	Mamrejpur	-do-
-do-	Purana Karim Nagar	-do-
-do-	Sakhin	-do-
-do-	Sandana	-do-
-do-	Sanauva	-do-
-do-	Semrauli	-do-
-do-	Sihauna	-do-
-do-	Tekari	-do-
-do-	Turkvapur	-do-
-do-	Wajidpur	-do-
Sitapur	Aralganj	-do-
-do-	Asrat Nagar	-do-
-do-	Chaupariya	-do-
-do-	Dev-Deveshvar	-do-
-do-	Lakhanpur	-do-
-do-	Paraspur	-do-
-do-	Prahladghat	-do-

86. Exploration in District Jaunpur.— K.P. Choudhary of the Mid-eastern Circle of the Survey, in the course of his exploration found N.B.P and grey ware in Nadiyanasa and Dihwan villages.

87. Excavation at Hulaskhera, District Lucknow.— In continuation of the previous year's work (*1981-82* pp. 71-72) the Department of Archaeology, Government of Uttar Pradesh, under the direction of R.C. Singh assisted by Hem Raj and Rakesh Kumar Srivastava, conducted excavation with a view to expose the eastern portion of the fortification wall belonging to the Gupta period and to understand its relation with other structures.

The eastern arm of the fortification wall was exposed upto 92 metres in length. This was built with brick bats during the Gupta period. Other structure was of Kushana period. Constructed out of burnt bricks (36 x 22 x 5 cm), it was exposed 6.63 m in length and 4.50 in width The surface of the road was made of lime mixed with earth. It was found running in east-west direction.

Tht contemporary pottery in the fort consisted of wheel-turned red ware ranging from

medium to coarse fabric. The main types included storage jars, short and high-necked water vases, dishes, bowls, *surahis* and sprinklers. Sprinklers and dishes of black slipped pottery continued upto the Gupta period.

The important finds included terracotta human figurines showing various hair styles, copper coins of Kushana period, beads of semi-precious stones, gold-coated beads, and stone sculptures of Ganesha and Mahisasuramardani Durga.

88. Exploration in District Mathura.— L.M. Wahal of the Northern Circle of the Survey, noticed a few sherds of ochre coloured pottery at Adinga. The site has also yielded a few sherds of Painted Grey Ware, black-and-red ward, and red ware of the Sunga-Kushana period.

89. Exploration in District Meerut.— During the course of exploration in Tehsil Mawana under the village-to-village survey scheme, C.P. Singh of the Northern Circle of the Survey, found Medieval pottery at Batnaur, Parichhat Garh, Shondat, Nagla Hareru and Danduapur. Three white marble idols of Jain Tirthankaras-Neminatha with Yakshi Ambika, Shantinatha, and Aranatha, dateable to tenth-eleventh Century AD were also noticed.

90. Excavation at Panduwala, District Pauri Garhwal.— The Department of Ancient Indian History, Culture and Archaeology, Garhwal University, under the direction of K.P. Nautiyal, assisted by S.S. Negi, D.L. Rajput, R.S. Negi, B.P. Badoni, J.S. Rawat, Rakesh Bhatt, Hem Gairola, Govind Nautiyal, B.B.S. Rawat, J.S. Negi and P.R. Semwal, carried out excavation at Panduwala in a dense forest, about 28 km east of Hardwar with a view to ascertain the cultural sequence and the spread of the Kushana settlement.

The excavation was carried to a depth of 2.50 m which revealed a single phase culture of the Kushana period. The lowest level of the site could not be ascertained. The excavation yielded wheelmade red ware with stamped and incised designs. The main shapes were short and high necked vases, bowls and dishes. Other antiquities recovered were iron Implements, and crystal beads. On the basis of these finds the site could be dated to first-second century AD.

Another site of a dry pond was also excavated. A brick sturcture of the Kushana period was exposed, the size of the burnt bricks used was 31 x 22 x 8 cm. To the north-west of this site, PGW along with the Kuninda coins were discovered on the surface.

91. Excavation at Damdama, District Pratapgarh.- R.K. Varma, V.D. Misra, J.N. Pandey and J.N. Pal, of the Department of Ancient History, Culture and Archaeology, University of Allahabad, carried out excavation at Damdama (26 1’ 0” N, 82 10’ 36” E), a Mesolithic habitation site. The site received attention because a few human skeletons were brought to light when villagers were digging a drain for irrigation purposes.

The excavation in the western, central and eastern sectors and also scraping of the drain section helped to understand the stratigraphy of the site. The top layer, layer-1 presented in all the excavated grids except in the western part and western grid of the western sector, where it was already removed. At many places it was characterised by thin lenses of lamination. Three

trenches were laid at different locations on the mound and a total area of 10 sq m was excavated. A large number of microliths, charred and semi-charred bones, burnt clay lumps and laterite nodules were found in this deposit. It also yielded a few pot-sherds, wheel-thrown red ware and glass bangles. The nature of the deposit indicated that it was a post-habitational deposit formed due to natural agencies. The earlier material was redeposited along with later material. After removing layer-1 in all the squares it reached to the top of the laycr-2. This layer was an undulating, hard and dark ash coloured deposit. Microliths in different stages of manufacte charred, semi-charred animal bones, burnt clay lumps, quern-fragments, mullers, hammer stones, hearths and burials associated with this level were found. The deposit represented the last phase of the Mesolithic culture.

Among the important features of a Mesolithic habitaton pattern mention may be made of human burial, hearths and hard burnt surfaces within the habitation area. Two human burials, one associated with layer-1 and another associated with layer-2 were excavated. First burial was a crouched burial and second was an extended burial. The dead were buried in shallow oblong graves. Burnt clay lumps and charred animal bones were found from the excavation of hearths. The shallow hearths were circular or oblong. One hearth was plastered with thick clay solution.

A large number of charred, semi-charred, and uncharred animal bones were recovered. It was interesting to note that about 90% of the animal bones were charred and semi-charred cattle. The species of the animals found were cattle, sheep, goat, sus, stag and deer. A large number of birds, fish and tortoise were found. The lithic assemblage consisted of fluted cores, flakes, and bladelets, blades, backed blades, scrapers, borer, triangles, trapeze and micro-burins. The fluted cores were extremely exhausted. A good number of querns, mullers, hammer-stones were recovered. Among the other artifacts, mention may be made of bone arrow-heads and rubbed laterite nodules.

92. Excavation at Hulas, District Saharanpur.— In continuation of the previous year's work (*1981-82* pp. 72-74), the excavation was resumed by the Excavations Branch II of the Survey, under the direction of K.N. Dikshit, assisted by P.K. Trivedi, K.K. Sharma, L.S. Mamani and B.B. Sharma. The main aim of this season's work was to understand the settlement pattern of the Late Harappans.

The Harappan strata which was found spread in an area of 2000 sq m, was 2.50 m thick and divisible into three phases. A total number of forty-three structures of different phases were encountered.

In the lower phase coarse red ware, a non-Harappan ware, was having a marginal contact with the Harappan pottery but in the middle phase the Harappan pottery dominated. Typical painted designs such as a Maltese cross and pipal leaves were also found. A sherd having three concentric circles with loops and dots over the cream surface similar to the polychrome ware reported from Surkotada was also found in this phase. In the upper Phase Harappan pottery continued with painted designs (pl. 60,61). Miniature pots dominated this phase.

Out of five structural levels, Harappan strata revealed three successive living usages. From

a total of forty-three structures including the floor-levels, five belonged to the earlier phase, thirty-two to the middle Phase and the rest to the upper Phase.

The rectangular and brick houses conforming to Harappan tradition were confined to the earliest Phase. A plan of a house having two rectangular rooms measuring 3.10 x 2.40 and 3.10 x 3.40 m in size constructed out of mud-bricks was noticed. Two courses of the partition wall with four extant bricks were found running 2.04 m in length in north-west alignment. The wall opposite to it was having five extant bricks. A part of the rammed floor of this room was found soled with three mud-bricks in a row along with four bricks placed against them. It had remains of post-holes. The size of the bricks used in walls and floor was 47 x 30 x 15 cm. Other connecting mud-brick wall of this room was running in the adjoining quadrant. The walls of room B were disturbed by the later pits, only a small portion was visible. In one corner of room A, a small circular pit revealed its use as corn-bin. The wall of the room running in south-west alignment was found partially damaged by a well constructed during Kushan times, two isolated mud clods used in the construction were also found placed in a row. Outside the north-eastern side of room A, a portion of a mud wall with a number of post-holes, was noticed, whereas on the north-western side remains of post-holes,corn-bins and 'U' shaped *chulaha* were noticed. A portion of a small irregular hearth disturbed by a pit was encountered. The whole area was having the burning effect. A round hearth was noticed outside the room A on the south-western side.

In other trench, three walls of a rectangular room exposed to a length of 2.20 x 1.60 m and a solitary wall of about 0.45 m in the corner, constructed out of mud and mud bricks and two drains cut in a floor level were noticed. A series of circular huts (pl. 62) sixteen in number, varying in sizes from 2.20 to 1.40 m in clusters of two, constructed out of wattle and daub as a part of rectangular mud walled houses, were noticed without any break in the middle and the upper Phases of the occupation. In the construction of circular structures, it was noticed that they were constructed after laying a foundation trench of about 0.15 to 0.20 m deep and 0.20 to 0.50 m wide. In it were placed the wooden poles and the space in between was filled up with wattle and daub. In one of them, even poles were placed in the centre. The outer and inner surface of the structure was coated with mud mixed with cow-dung. The remains of plaster showed marks which might have been made by some reeds or reed-like plants. Inside a few of these structures were found patches of burnt earth signifying their use as a fire-place. Near one of the circular structures, a row of seven miniature pots covered with lids and a few miniature pots lying *in situ* was noticed (pl. 63). In the back of a fairly large circular structure having pieces of charred bone, a small circular pit was noticed having raw bones of animals. It possibly served as a refuse pit. That domesticated animals were tethered in the open is proved by the examination of the nitrogen contents from inside and outside the circular area. The close examination of these structures revealed that possibly all of them were not meant for dwelling purposes, but their use for storage cannot be ruled out.

The rectangular structures of mud belonging to the middle phase continued into the upper phase of the Harappan occupation. In this case, low mud walls were constructed first.

The presence of a few post holes suggested that the superstructures of wattle and daub were raised over it, and in this way they were different in architectural details while comparing with the circular ones. The size of one of the rooms noticed was 3.30 x 2.70 m and the thickness of the wall was 0.60 m. The floor was found rammed with clay and cow-dung. This observation was made as a part of the floor-was damaged and found quite different from the rest of the rammed area. A portion of the floor lying on the noth-west side which was considerably burnt, appeared to have been used as a fire place. The size of the adjoining room was not available. One side measured 2.40 m. In one case, two corn-bins were found on the top of the low mud walls of a room, whereas in the other case it was just on the junction of two walls.

In five cases, in the upper phase round furnaces were also noticed inside the rectangular rooms. One of the rooms measuring 3.40 x 2.40 m was having an intact circular furnace on its southern corner. Such a large furnace was perhaps not for the normal cooking purpose, but for some commercial productions. In fact such furnaces right from the beginning upto the end of the Harappan occupation were found in the area, although in the upper phase they tend to become smaller. Three irregular furnaces of various sizes, one of them about 2.60 m in length, disturbed by pits were also noticed. A large oval furnace (1.80 x 1.25 m) inside a room was also encountered. In another case, the size of, furnace was 1.30 x 0.80 m. It appeared that the craftsmen of the area were also having their workshop adjoining to the habitational area which was separated by a long mud-wall (17.60 x 0.80 m). Last year a very large stone anvil was found in this area.

In many cases the position of post-holes do not convey any specific plan. Possibly the area was used successively and the position of different plans raised again and again. In the vicinity of the habitation area, the people of the successive culture, the users of the Painted Gray Ware, dug many circular pits. A good number of the Painted Grey Ware sherds (pl. 64) were found in these pits. In one of the pits, it was noticed that they dumped the Harappan remains of burnt wall plasters. A few of the pieces of these plasters have been sent for laboratory examination. The samples including a few pot-sherds from Hulas, on examination by. Birbal Sahani Institute of Palaeobotany confirmed the knowledge of rice. Other food plants known to Harappans at Hulas were barley, wheat, horse gram, peas, green gram, black gram and finger millet (ragi), the latter is the staple diet of Central India.

Important antiquities included terracotta animal figurines, cakes, truncated bicone beads, and ball with incised fish-mark; fragmentary copper bangles, chisels, spiral rings, wires, needles with eye and fish hooks, bone points, stone quern and pestles; faience objects—beads, bangles and pots, and also beads of agate. Various sizes of indeterminate terracotta objects were also encountered. These were described differently, but their use in a group of three or more as stands for pots cannot be ruled out, because similar stands were found in the Neolithic levels in Anatolia.

A single thermoluminescence date from the upper phase (Layer 3) (supplied by PRL, Ahmedabad) is 3230 (± 280) i.e. 1280 BC. The Harappan might have continued for another one hundred years.

A well made of wedge shaped burnt bricks (pl. 65) with an exterior diameter of about

1.44 m was noticed in the courtyard of the massive burnt brick structure ascribable to the Kushana period. The sizes of bricks vary from 37 to 39 cms in length to 15-16 cms in width at wider end and to 10 cms at the narrow end with 7 cms thickness. From the upper levels of the mound, a hoard of 35 copper coins associated with Medieval structures was also found.

93. Excavation at Thapli, District Tehri—Garhwal.— The Department of Ancient Indian History, Culture and Archaeology, Garhwal University, carried out excavation at Thapli under the direction of K.P. Nautiyal, assisted by B.M. Khanduri, Vinod Nautiyal, D.L. Rajput, S.S. Negi, B.P. Badoni, J.S. Rawat, Rakesh Bhatt, Hem Gairola, B.B.S. Rawat, J.S. Negi and P.R. Semwal. Thapli (30°, 12' N, 78° 47' E) situated on the right bank of River Alakananda of Srinagar. A trial trench 5 x 2 m was laid out. The excavation revealed a single phase culture of P.G.W. along with its associated types in other wares and related material.

This habitational deposit consisted of three layers with a total thickness of 1.20 m. The P.G.W. was confined to the dish and bowl and the miniature vase with painting. The other associated types were in the black slipped, grey, fine red and coarse red wares. The main shapes in the associated wares were dishes, bowls, vases, and basins. It is interesting to note that some shapes like the basins, and the vases were found both in the coarse red ware as well as in the plain grey ware. The Thapli P.G.W. having several paintings (pl. 68), such as the sun symbol along with horizontal and vertical bands, horizontal rim bands, dots, sigmas, concentric circles, intersecting strokes, wavy lines, spiral designs, double lines with dots, leaf and floral patterns showed maturity in the art of painting.

Among other finds were a terracotta bird, perfectly baked, showing a pale-red colour and decorated with notches on the body, copper bangles, copper nail parers, and terracotta beads. A red ware sherd depicting a husk mark indicated the use of rice during the period.

The study of faunal remains by G.L. Badam of the Deccan College Post-graduate and Research Institute, Pune, brought to light remains of *Bos indicus, Sus Scrofa cristatus* and *Equus caballus.*

94. Exploration in District Uttar Kashi.- The Department of Archaeology, Government of Uttar Pradesh, undertook explorations in hilly regions, under the direction of R.C. Singh, assisted by Rakesh Tiwari, Rakesh Kumar Srivastava and Ram Gopal Mishra, and discovered the following sites:

Stone implements oval in shape with hafting marks worshipped as Tataun Mahadeo were noticed near Gangeni village in Rajgarhi Tehsil. The average length was 18 cm and radius was 13 cm. Similar implements have also been found in the Neolithic culture of peninsular India.

In the Devadhunga village about 1.5 km from Purala, a Mauryan brick (49 x 26 x 12 cm) structure of about 1.35 m high from the surrounding level was noticed. It looked like a Mauryan Buddhist Stupa. Sherds of grey ware and red ware were also collected from the area nearby.

WEST BENGAL

95. Exploration in Districts Bankura, Midnapur and Purulia.- S. De, D.K. Roy and B. Samanta of the Department of Archaeology, Government of West Bengal, explored the uplands of the western plateau lying in the western border of West Bengal and discovered the following Stone Age sites:

District	Village/Site
Bankura	Kanthalia
	Madhavpur
	Mahishamure
	Rajapahar
	Tilaboni
Midnapur	Asri
	Barapal
	Chamargara
	Domahani
	Gidighati
	Laljal Caves
	Majugara
	Patghar
	Ranipahar
	Srinathpur
Purulia	Kotshila
	Belamau
	Jaborbani hill

96. Exploration in District Burdwan.- T.J. Chakraborty, of the Eastern Circle of the Survey, in the course of his exploration noticed the following sites yielding black-and-red ware: Basantapur, Silut, Berenda and Kantatikun.

97. Excavations at Laljal, District Midnapur.- S. De, D.K. Roy and B. Samanta of the Department of Archaeology, Government of West Bengal, carried out small-scale excavation of a cave with a view to ascertaining the potentiality of the site. The cave was about 3.2 m in height. A rock painting under the projected roof was also noticed. The excavation revealed three different layers. Layer (1) yielded iron implements, human bone fragments, charred bone pieces and coarse-brown pot-sherds. Layer (2) yielded broken ring stone and from the layer (3) microlithic flakes were collected.

98. Excavation at Ballal Dhipi, District Nadia.- The Eastern Circle of the Survey, under the direction by Bimal Bandyopadhyay A. Jha, G.N. Srivastava, Tapan Jyoti Chakravarty, S.K. Ghosh, S.K. Kundu, K. Srimani and P.C. Das, carried out excavation under the general guidance of N.C Ghosh. The excavation was undertaken with a view to ascertaining the antiquity of the site which is traditionally associated with the Senas of Bengal.

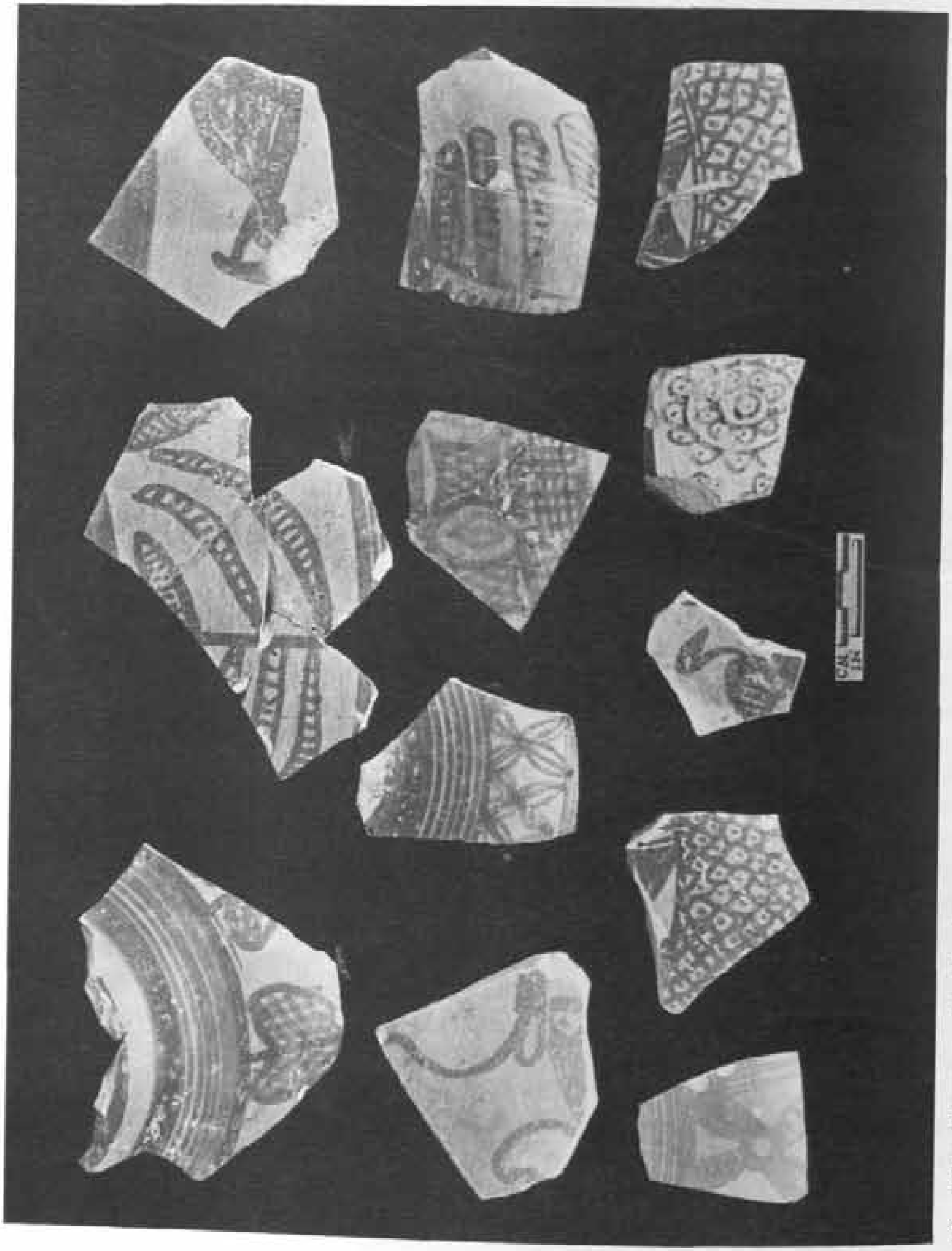
The mound covered an area of 128 x 100 m. The excavation revealed a massive brick wall measuring 4.10 m in width and 3.48 m in height from the original ground level. The wall was repaired at least twice after its initial construction. The bricks from the first phase measured 16 x 10 x 4 cm whereas in the later phases the bricks of different dimensions were introduced along with the bricks of the first phase. In the later construction, bricks of 21 x 18 x 4 cm size became common. The wall was exposed to a length of 22.70 m on the eastern periphery of the mound and 50 m on the southern side.

At a later stage and contemporary to the second phase an outer wall of 1.68 m thick was added. The wall ran parallel to the earlier wall atleast on the southern side (pl. 69). The nature of the walls indicated that they were meant for enclosing the settlement. In the centre of the settlement, remains of extensive brick-built flooring were seen.

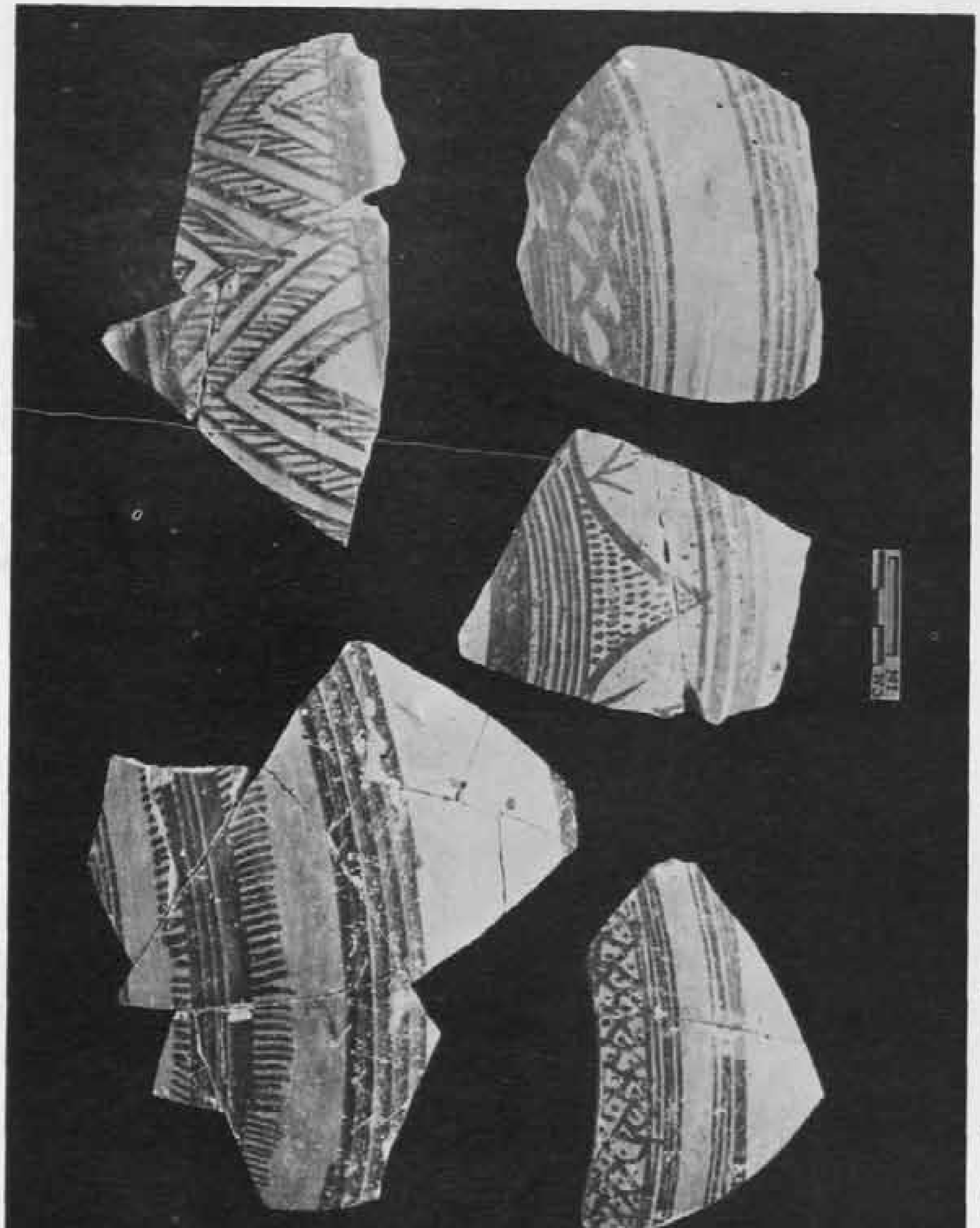
In one of the trenches, a structure, nearly 8 m of extant height was found. The facade of the structure was relieved with offset projections at regular intervals. The diminishing dimensions which produced a pyramidical elevation was another notable feature of this structure (pl. 70). The exposed portion revealed that it was cruciform on plan. This form was retained in all the stages of repair. In the top most level a brick edging was provided in an identical fashion to the rammed lime surkhi flooring. A circular brick lined fire-place was encountered, the diameter at the top was 70 cm and at the bottom 50 cm. The entire complex within the brick enclosure strongly suggested it was a religious edifice.

Four phases of floorings were encountered (pl. 71). The upper most was represented by a rammed lime surkhi floor with brick edging. Remains of a brick flooring which appeared below was more extensive than the upper one; however, its plan could not be fully retrived. The next two successive floor levels were raised above fluvial. It is probable that earlier the River Ganga was flowing close to the site and has now shifted about 4 km away.

A good number of stucco figurines (pl. 72) with human and demonic heads and decorative motifs were recovered from the top level. The human heads were showing *urna* on their forehead and the top knot indicated their graceful divine character. The demonic figures were marked by their round protruding eyes and grinning faces. These stucco figurines resemble those recovered at Rajbadidanga (*1963-64* p. 63) and dated to C. 9th-10th century AD. A large number of architectural remains were also recovered from the same level. The ceramic industry comprised of *handis,* jars, bowls, dishes in red ware, mostly unslipped and a few were slipped with dull grey material having impressed leaf, floral and blocks of miniature squares.



60. Hulas Harappan painted sherds.



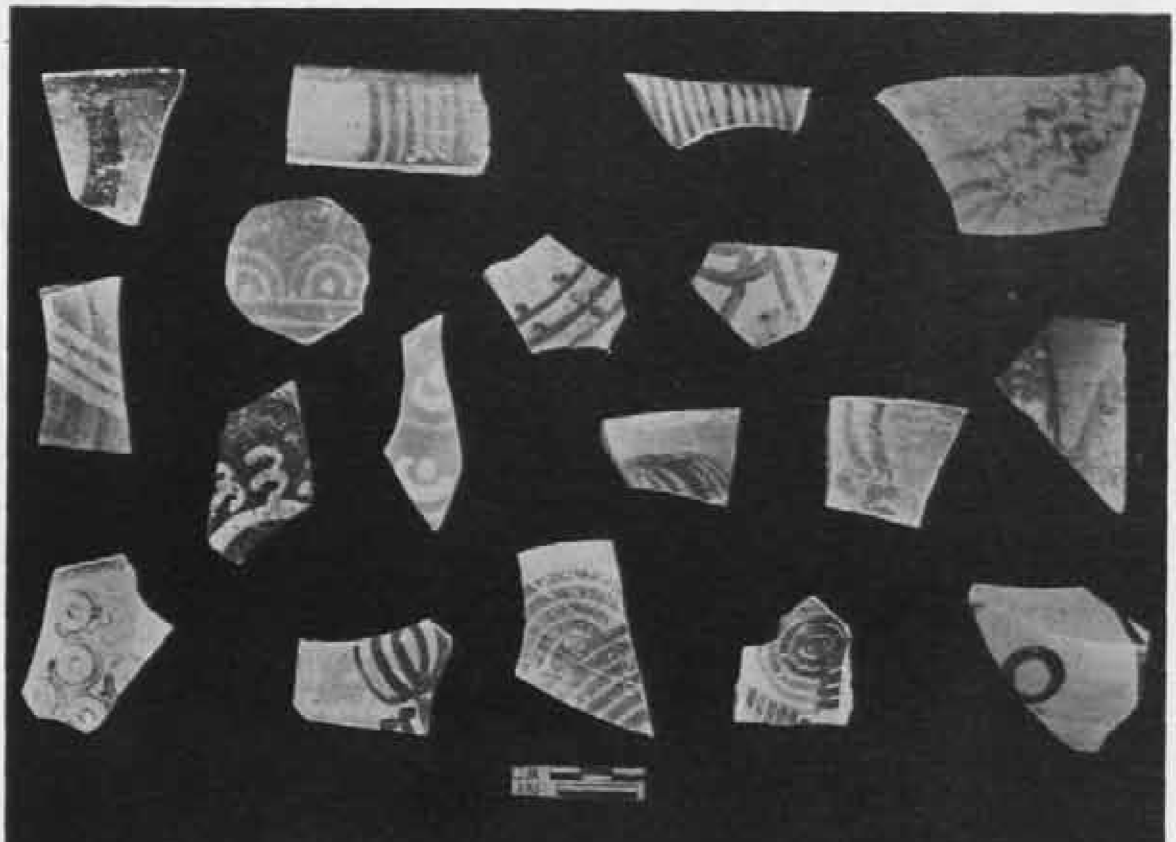
61. Hulas Harappan painted sherds.



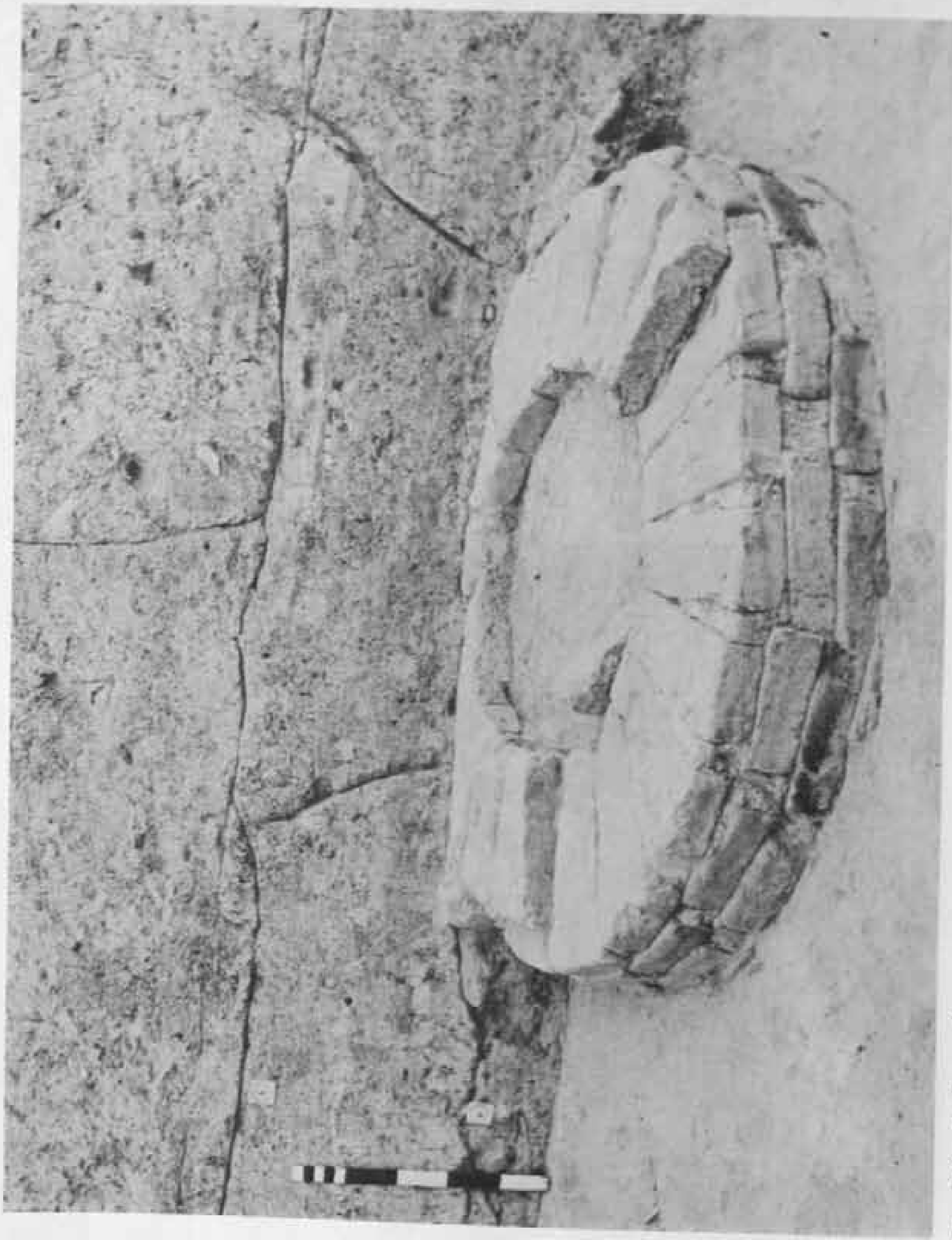
62. Hulas circular hut and mud walls.



63. Hulas miniature pots in a row (inside). Period IB.



64. Hulas Painted Grey ware sherds.



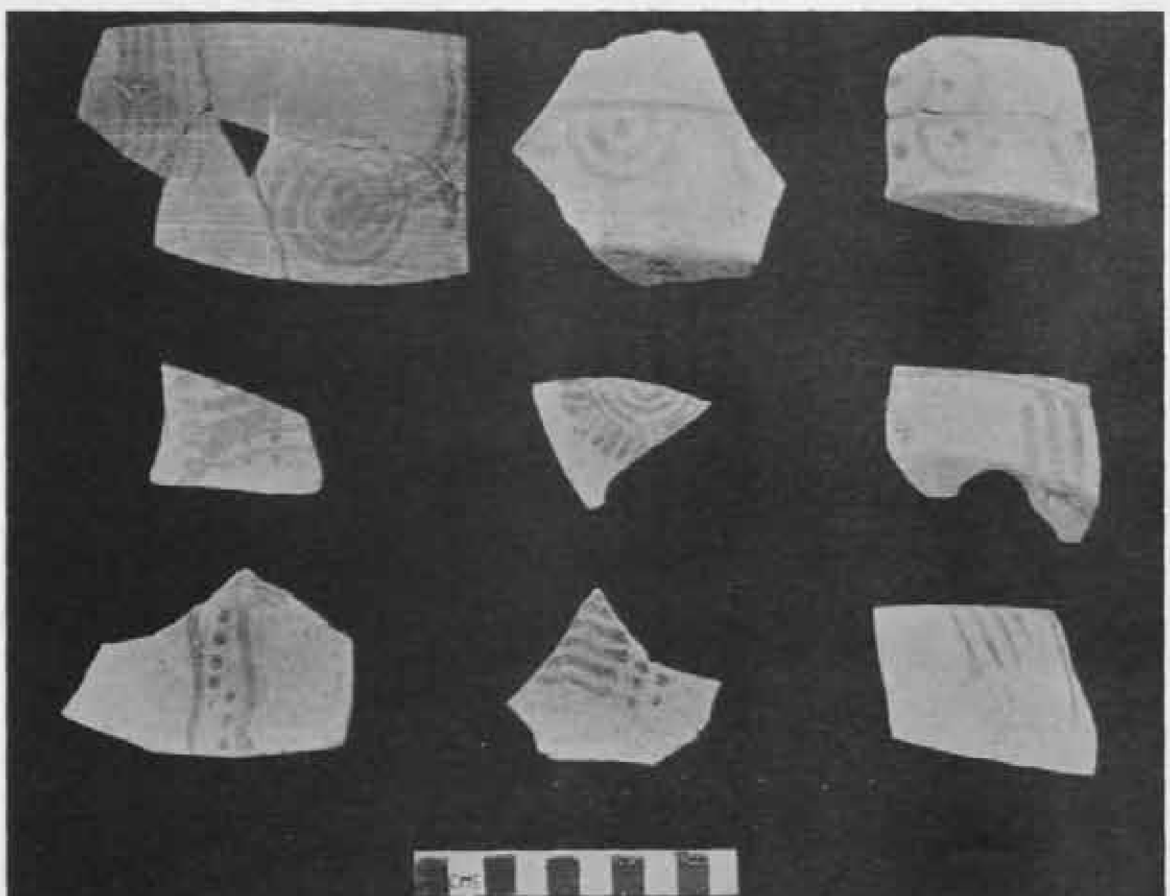
65. Hulas Kushana well.



66. Malari funerary pots.



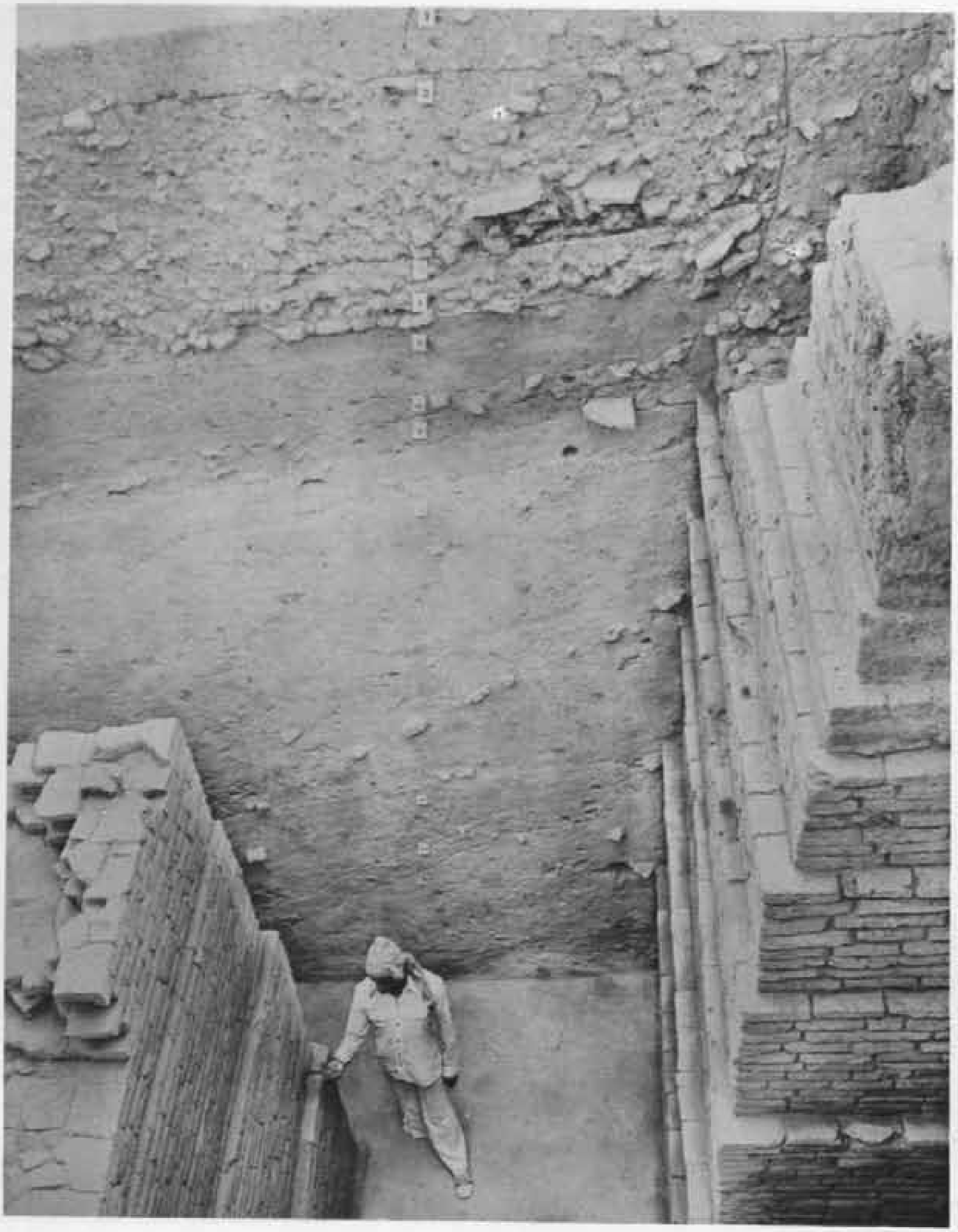
67. Malari funerary spouted vessal.



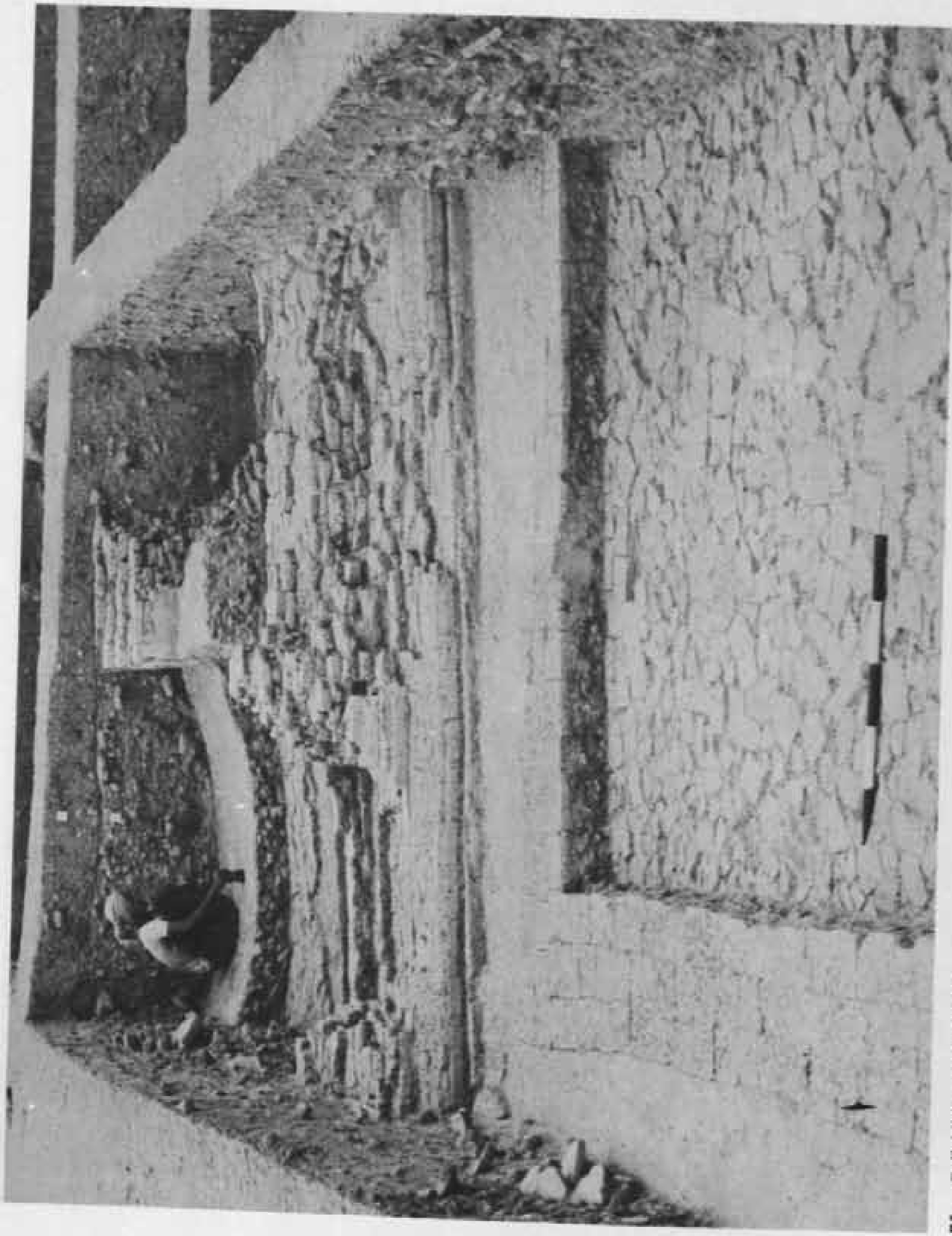
68. Thapli painted grey ware sherds.



69. Ballaldhipi brick-built compound wall.



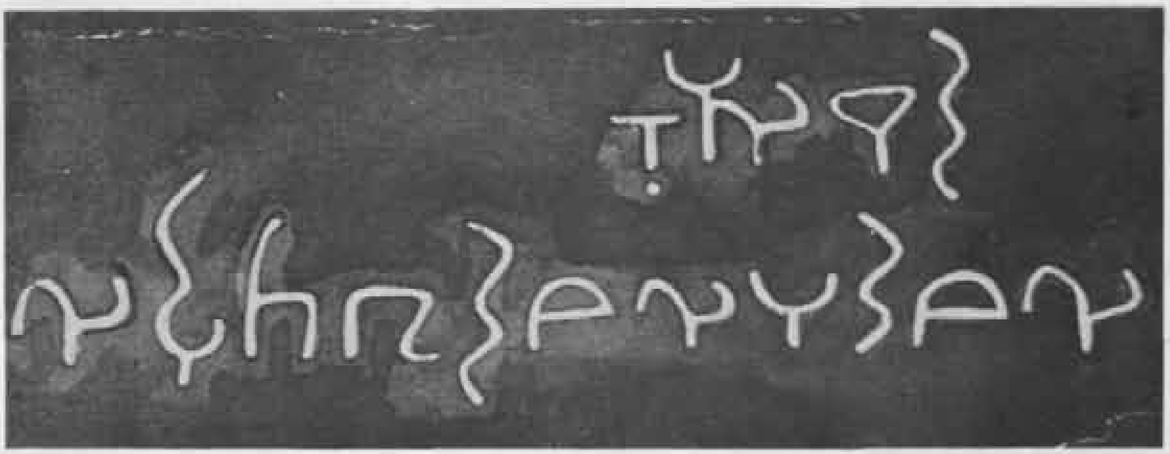
70. Ballaldhipi pyramidal elevation of the structure.



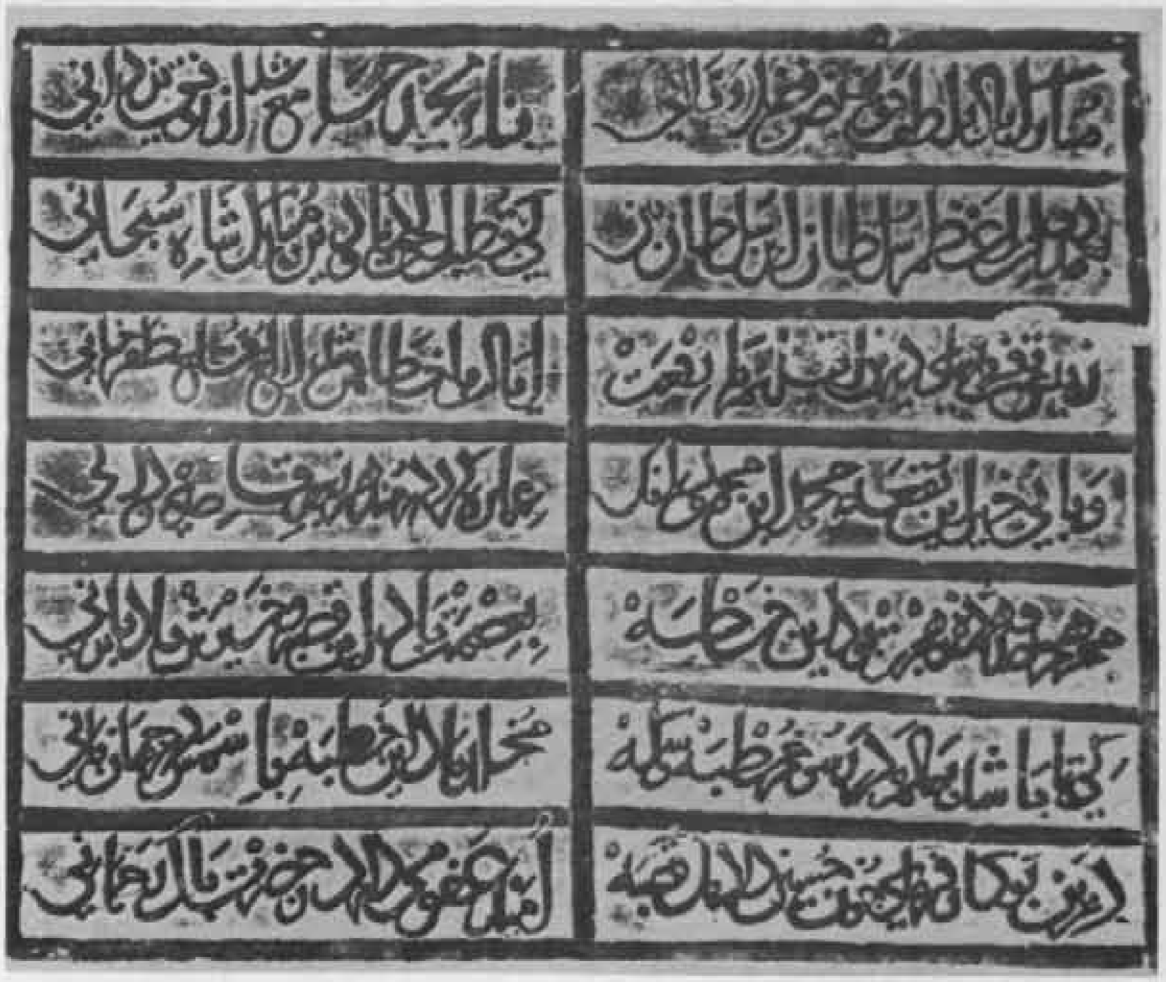
71. Balladhipi floor levels.



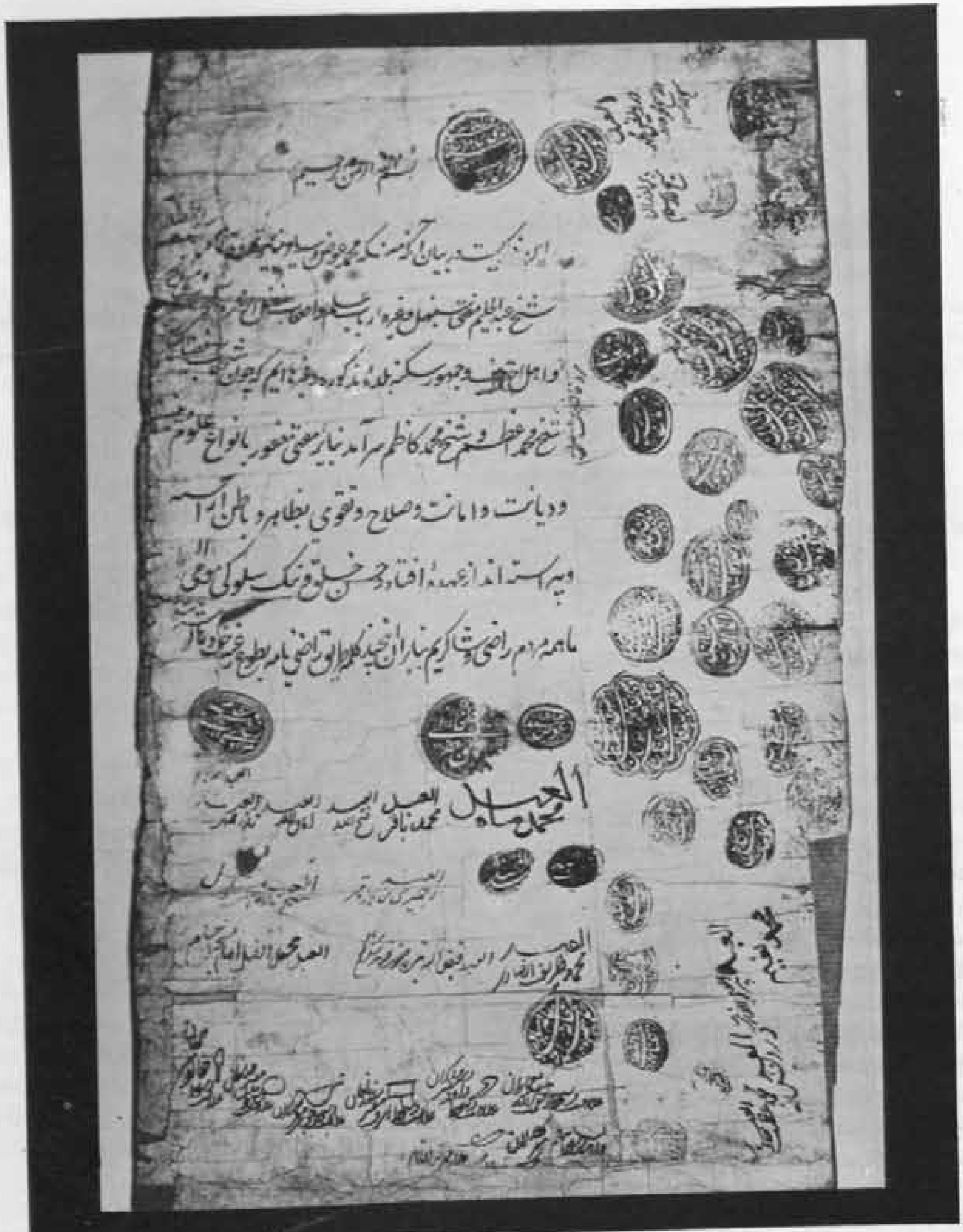
72. Balladhipi stucco figurines.



73. Nadafa impression of inscription found in a rock-shelter.



74. Nahudha inscription of Qutbud-Din Mubarak I.



75. Sambhal Razi-Nama.

EPIGRAPHY

Sanskritic and Dravidian Inscriptions[1]

ANDHRA PRADESH

1. Prakrit Inscription, Amaravati, District Guntur.— This Brahmi inscription of about second century AD, engraved on a broken slab is now preserved in the Amaravati Museum. The inscription refers to the installation of *vedika* and *padasuchi* and records the gift of a *prakara* by Naga, the wife of some Naga, who was the disciple of Thera Dhammpala.

2. Stone Inscription, Amaravati, District Guntur.— This inscription in Telugu language and script engraved on a slab is now in the store room of the Amravati Museum (No. 1018) and is dated in Saka 1077 (AD 1155). It refers to a gift (details lost) of Amaresvara temple by Kundamadevi, the queen of Mahamandalesvara Mandaraju of Konda Padumati family.

3. Telgu Inscription of a Viriyala Chief, Amaravati, District Guntur.— An undated inscription in Telugu language and characters of about the eleventh century AD mentions Samanta Viriyala Gannayadeva, who is stated to have gifted fifty-five cows towards main tenance of a perpetual lamp probably belonging to the god Amaresvaradeva for the merit of his parents Lakumadevi and Pammivallabharaju as also for his uncle Malraju.

4. Telugu Inscription, Amaravati, District Guntur.— Dated in the *Saka* 1640 (AD 1718), this inscription in Telugu language and script, refers to the making of a flower garden near the big *prakara* and the construction of the north *prakara* on the *upajagati by* Padmaraju, on the occasion of lunar eclipse for the temple of Amaresvaradeva.

5. Two Vijayanagara Inscriptions, Illuri Kothapeta, District Kurnool.— These two inscriptions in Telugu language and script belong to the reign of Sadasivadevaraya of the Tuluva dynasty. The first one dated in *Saka* 14(6)3, Plavanga (AD 1541), mentions maha mandalesvara (name lost), son of Srirangaraju who is described as the *anarghya-ratna* in the family of Ramaraju, with the family name Araviti, Pebbuli-Chalukya-Narayana, and belonging to the lunar race and Atreyagotra. It also refers to the establishment of the *agrahara* Honna-pura alias Krishnarayapura, by Bokasam Honnapa-nayaka and its being granted to Mantri-pragada Mallayya of Devarakonda, Mantrayya and Timmayya. It further states that the

[1] Information from : 8, 12, Director, Archaeology and Museums, Karnataka; 17, Curatorm Kutch Museum, Bhuj; 13, Director, Archaeology and Museums, Madhya Pradesh; 17, 19 and 23, University of Nagpur; 22, Shobhana Gokhale, Deccan Collage Postgraduate and Research Institute, Pune; and the rest from the Chief Epigraphist of the Survey Mysore.

agrahara was established in Munipalli situated in the territory of Mukku and was given away with a copper plate. The Second epigraph dated in *Saka* 1474 (AD 1152) records the gift of money accrued from the tax called dommaripannu, probably for the offerings and services during Sivaratri to the god Sidhayalinga at Villuru by Kathari misaraganda Timmaraju for the merit of his family members.

6. Vatapi Chalukya Prasasti, Alampur, District Mahbubnagar.— This inscription in archaic Telugu Kannada characters of the eighth century, contains seventy-four stanzas in Anushtubh metre which is engraved on three sides of a pillar in front mandapa of Bala-Brahma temple. It is an eulogy of the Vatapi Chalukya dynasty and its three successive members, Vikramaditya I, Vinayaditya and Vijayaditya. Twenty-two stanzas of this inscription are devoted to the praise of Vijayaditya, many benign features of whose peaceful reign are for the first time described by this prasasti. This inscription also reveals for the first time that Vijaya ditya had married Mahadevi, the daughter of Vishnuraja, the Sendraka lord of Karahatapura.

7. Brahmi cave inscription, Kutch, District Bhuj.— A Brahmi inscription in characters of *circa* second century AD engraved in a rock-shelter which records (pl. 73) a Buddhist name Sachajit and reads *sachajiti sachdeva putras devastanam.* The inscription is the first of its kind as it is found in a rock shelter.

KARNATAKA

8. Kannada Inscriptions, Hampi, District Bellary.— Of the three Kannada label inscrip tions, the first one on the top boulder to the north of the Nobleman's palace area, and to the west of the gateway reads Hampeya Kotala meaning "the bastion of Hampe" which appears to be a watchman's point.

The boulder on the top of the hillock to the west of the zenana enclosure contains an incised figure of Hanuman. A single line inscription on the figures reads Hanumana Kottala means that "this is the bastion of Hanuman" which seems to have served as a watch tower.

The third one, in the entrance of a fort wall near the steps on the south of Matanga hill, traced on a boulder, also contains a two line inscription reading *matangesvara devara diddi* "(this is) the small entrance of the god Matangesvara".

9. Fragmentary Chalukya Inscription Aihole, District Bijapur.— An unfinished two lined archaic Kannada inscription in characters of the seventh century and in Sanskrit Langu age is engraved on the facade of a cavern which states that the cavern was got made by the Mahajanas as a memorial temple of Satyasraya Maharaja, i.e. Chalukya Pulakesin II. The inscrip tion mentions Vikramaditya I as yuvaraja and describes him as partaking of the wealth, the earth and the pride of the Chalukyas by his subservience at his father's feet *(tat-pada-padma-opasraya-prasad-opatta- sri-mahi-mana-bhagi).*

10. Kalyana Chalukya Inscription, Lakshmesvara, District Dharwad.— This inscription, in Kannada script and language, belongs to the 4(5)th regnal year (Chalukya-Vikrtama year 4(5), Palva AD 1121) of the Chalukya king Tribhuvana malla (Vikramadiya VI). It records the grant of land for the maintenace of a tank called Agastya-tirtha, restoration of the Siva temple and feeding of the students, devotees and the goravas. The inscription eulogises Savideva-dandahipa, who is stated as administering Banavasi 12,000, the two six-hundred, the Vaddara-vula tax and the Uttamabhatta-gramas, and his suboridnates Nagavarmmachamupa and his brothers Govinda-dandahipa and Amman-nebhatta-dandahipa. It also describes the tank Agastya-tirtha and Purikaranagra.

11. Yadava Inscription, Lakshmesvara, District Dharwad.— The inscription, in Nagari script and Sanskrit language, belongs to the region of the Yadava king Ramachandra and is dated *Saka* 1199 (AD 1277) and records the grant of land for the maintenance of lamps and different services and offerings to the god Sarvajna-Gopinathadeva, by the minister, Tippa-Chamupati who was encamping at Sardulatadaga-pura.

12. Hoysala copper plates, Herur, District Tumkur.— A set of five copper plates bound together by a ring with the royal seal were found in a pot while digging the land for laying the foundation of a building.

MADHYA PRADESH

13. Copper plate inscription, Bijabar, District Chhatarpur.— A copper plate inscription of Bundela ruler Maharaja Chhatrasala Ju Deo, in Nagari script and Hindi language is dated in samvat 1759. It refers to the grant of twenty-five Mahuva trees to one Gangaram made by Chhatrasala Ju Deo.

14. A Hoard of twenty-seven copper plates, Bagh, District Dhar.— A hoard of copper plates was found in a field adjacent to an adivasi settlement called Risavla located at a distance of one kilometre from Bagh. Except one, all the plates were issued by five different kings from Bagh, the ancient city (*adhishthana*) of Valkha. Every plate bears an inscription on one side and contains detailed dates. The rulers were referred to as Maharaja and Parama-bhattaraka.

Of these thirteen plates refer themselves to the regin of Bhulunda (years 47, 50, 50, 51, 54, 54, 54, 55, 55, 56, 57, 57, 59), five to Svamidasa (years 63, 63, 65, 65, 66), five to Rudra-sada (years 68, 68, 69, 69, 70) three to Bhattaraka. (year 102,127,129) and one to Nagabhata (year 134) and their dates range from the years 47 to 134 of an unspecified era which on grounds of palaeography however, belongs to the Gupta era (AD 319-20).

These charters record grants of lands either to deities or to individual brahmanas or to the association of brahmanas known as *arya chaturvaidya-samuha,* and mentions Narayana, i.e. Vishnu as main deity although, there is reference to the worship of Bappa pisachadeva and Pasupata, Chauksha and other sects also. Most of the place names mentioned in the grants

either territorial divisions like *rashtra, padraka, bhukti, avasa and pathaka* or villages which are said to be situated on the banks of the river Narmada.

15. Inscription of Aulikara, King Naravarmman, Kotra Bihar, Narasinghgarh, District Rajgharh.— This Sanskrit inscription in Gupta characters is noticed inside a cave-shelter. It introduces Maharaja Naravarmman as the son of Maharaja Simhavarmman and bears the date (Vikrama) year 4784, the fifth day of the dark fortnight of the month of Phalguna. The inscription records the excavation of the cave-shelter for the use of the itinerant sangha mem bers, by Samghila, the disciple of acharya Bhadantadas.

16. Inscription of Aparajitavardhana, Narasinghgarh, District Rajgarh.— This inscription, noticed on the wall of a rock-shelter is engraved in late Brahmi characters of about 5th century AD and composed in Sanskrit prose. It belongs to the times of Aparajitavardhana, son of Trailokyavardhana of Mukharasagotra. The inscription records the grant of land to the Budd hist Vihara. It also mentions that this and the other adjoining rock-shelters were then tradi tionally known having served as viharas right from the days of Asoka (*prakalikayanusfuta-praktanasunya-vihareshu).* The *bhikshus* of the sangha are referred to as *aranya-kand-adhyayis* and the terms and conditions regulating the grant are termed as *brahmadeya-bhukti.*

17. Stone inscription, Pauni, District Bhandara.— A fragmentary Brahmi inscription, assignable on palaeographical grounds to circa second century BC is now preserved in the Nagpur University Museum.

MAHARASHTRA

18. Silahara copper plate charter, Kolhapur, District Kolhapur.— The charter in Kannada language including characters is dated Saka 1077 (AD 1154). The record belonging to the reign of Gandaraditya of the Silahara family, states that his feudatory Mahamandalesvara Vijayaditya was governing from Aualavada. It mentions Kuchiraja as the grandson of Satkavin-drottama Pampa and as the father of Kappadeva alias Kappana who is referred to as the Mahamatya Mahapratihara and Sandhivigrahi of Vijayaditya. The record registers the grant of land and house-site, at Siriguppe near Mirinje-nadu, earlier granted by Kuchiraja, at the ins tance of Kappadeva, by Mahamandalesvara Vijayaditya, for the ashtavidharchane of the deity. *Santinathadeva,* at the basadi situated at Kolhapura, repairs to the basadi and feeding of the ascetics therein. The grant was made over to Vardhamana bhattaraka, disciple of Kukkuta-sana-Maladhari-svami, belonging to *Mula-sangha, Desiya-gana* and *Pustaka-gachcha.* The inscription furnishes the earliest copper-plate reference for Pampa, the famous court-poet of Arikesari of the Chalukya dynasty of Vemulavada.

19. Vakataka copper plates of Rudrasena II, Mandal, District Nagpur.—This is a set of

four copper-plates, recording the grant of four villages, viz., selluddraha, Achchhikabhallika, Saragramaka and Aragramaka, situated in the eastern division (purvamarga) of Padmapura in favour of a couple of residences of the followers of the Satvata charana at the command of the Seshasayi Vishnu known as Mondasvamin by the Vakataka king Rudrasena II in the fifth year of his reign. The inscription written by senapati Vibhishana, is the only known copper-plate charter of Rudrasena II, now deposited in the Museum of Nagpur University.

20. Badami Chalukya copper plate charter, first set, Tembhurni, District Sholapur.— Engraved in southern characters of about the seventh century AD and Sanskrit language and composed by Mahasandhivigrahika Jayasena. This set of three copper plates belongs to the reign of the Badami Chalukya king Vikramaditya I which records the royal grant of the village Pariyanda to the brahmana Vishnusarman at the request of Yuvaraja Vinyaditya.

21. Badami Chalukya copper plate charter, second set, Tembhurni, District Sholapur.— This Sanskrit inscription composed by Mahasandhivigrahika Jayasena in southern characters of about the seventh century AD is a set of three rectangular copper plates belonging to the reign of the Badami Chalukya king Vikramaditya I. It records the royal grant of the village Pippariyakheda to two brahmanas probably at the request of Yuvaraja Vinayaditya.

22. Stone inscription, Kanheri, District Thane.— Of the two commemorative inscrip tions, the first one reads: line I, *theranam ayyaputa,* line *2-nam arhantanam chhala* and line *3-binamam satanam satnam thubhan.* The second one mentions the names of the monks as Jayi and Tinna. It reads: in line I, *theranam che,* line *2-jayinam tinhanam Araha* line *3-ntanam thumba.*

23. Copper plates of Pravarsena II, Yawatmal, District Yawatmal.— The inscription written by Senapati Bappadeva records that the Vakataka king Pravarasena II confirmed the grant of a piece of land and two residential sites in the village Latakapalli situated in the district of Shadgrisaka in favour of Indrarya and Svamideva of the Taittitiriya sakha (of the Yajurveda) and vatsa gotra in the twenty-sixth year of his reign

TAMIL NADU

24. Three inscriptions of the ruler of Kongu, Kadattur, District Coimbatore.— The inscriptions in Tamil language and characters are engraved on the western wall of the central shrine of the Tirumarududaiyar temple. Of the three inscriptions, the first one, dated in the twenty-second regnal year (AD 1228-29) of Virarajendra of Kongu, records the gift of two Kalanju of gold for a *tiruvaram* given by Kumaran Sattan alias Visaiyadaninjaya-ppallava-raiyan, the nayaka of Ayiravar stationed at Kadarrur for the deity Marudavanapperumal in the temple of Tirumarududaiyar. The second one, dated in the same year which is incomplete. It records a gift of six *achchu* by Velalan Kumaran alias Kumaran Dananjiya-ppallavaraiyan of

Palaikattuchcheri in Vellappa-nadu, a padai (valavam) of Ayiravar stationed at Kadarrur alias Rajarajanallur in Karaivali-nadu, for the group who recite Tiruvembavai before the deity Tirumarududaiyar. The third one is dated in the forty-fifth regnal year (AD 1251-52). The inscription records the gift of land made after purchase from Viman Udaiyan alias Ulagudaich-chola-Vachhi-yamarayan, one of the *parasivas* who had the *kani* right in the village, for a value of twenty-three *siriyakki-palanchalagaiachchu,* by Alavandan Avinasi alias Kachchiyarayan, a *puravari* officer of the king (*Prumal*) for the food-offerings to the deity Mangayakkarasu nachchiyar installed by him in the tirukkamak-kottam in the northern division of the temple of Tirumarududaiyar at Kadarrur alias Rajarajanallur in Karaivali-nadu. It further states that on the orders (*tirumugam*) of the king, the *kani* lands from the Uvachchapuram of the god was sold by him and the pricevalue was to be deposited into the treasury. It is also mentioned that gift was to be maintained by Ulagudaichchola-Vachchiya marayan and his heirs.

25. Vijayanagar inscription, Karakuppam, District Dharmapuri.— This inscription engraved in Tamil language and characters, dated in Saka 1326, Tarana (AD 1404), belongs to the reign of Nanjamanna-udaiyar, a mahapradhana of Ramaraja-Udaiyar, son of Hariraya. It records the grant of the area to the east of Sambam-pallam by Timmana-udaiyar, Sri Girinadar, Duvarapativelar, Adichchadevar and others of Palasamudram in Angananadu, as *sarvamanya-agaram,* in the name of (So)mappa-Udaiyar, on the occasion of solar eclipse.

26. Stone inscription, Sevur, District North Arcot.— This Tamil inscription engraved in Tamil characters of about the ninth century on a broken stone set up in front of a Vishnu temple states that Sattayan, son of Sinri Sandanayan of Kumili in Amur Kottam got a sluice constructed at the mouth of a channel of the river of Sevur in Karaivali of Perumbana- ppadi and arranged for its flow into the lake of the village.

27. Jaina inscription, Siyamangalam, District North Arcot.— A Sanskrit inscription in Grantha characters of the ninth century AD is engraved on the entrance of a cave and extols the Arunkalanvaya, which was adorned by the illustrious pontiffs, who were proficient in all sciences (*nissesha sastra-Varasi-paragaih*) and states that the Western Ganga king Rajamalla II caused the installation of two images of Jinaraja at a hill called Vijayadri in Saka 815 (AD 892-93).

28. Vijayanagara inscription, Siyamangalam, District North Arcot.— This Tamil inscrip tion dated in Saka 1287, Visvavasu (AD 1365) engraved on the west wall of the *mandapa* of the rock-cut temple, and assignable to the reign of the king Kampana-udaiyar, son of Buk-kanna-udaiyar. It records the order of Koppannangal granting all lands along with income from taxes on wet and dry lands excluding the *tirunamattukani* lands in the village of Siyamangalam as *sarvamanya* for the worship, five perpetual lamps and services to the deity Tunandar of Kulottungasolanallur alias Siyamangalam in Tennarru-nadu in Palkunrak Kottam in *Jayan-*

go-ndasola-mandalam.

29. Vijayanagara inscription, Vaniyambadi, District North Arcot.— Inscribed on the north wall of Alagapperumal temple, the inscription is in Tamil language and characters of the fourteenth century. This refers to Vira Viruppana Udaiyar, son of Ariyana Udaiyar (Harihara II) and records the grant of six hundred *kuni* of land as *sarvamanya-iraiyuili* for the food offerings, lamp, etc., on the occasion of the festival called Kesavanata-Udaiyartirunal to the deity Tirumalirunjolai Alagapperumal of Vaniyambadi, probably also named Madurantakach-Chaturvedi-mangalam in Aimpulungur-nadu.

30. Pandya Inscription, Elvanasur, District South Arcot.— This Tamil inscription, in characters of the thirteenth century engraved on the south wall of the first *prakara* of the Gramardhanatha temple is dated in the eighth regnal year (AD 1304) of Chadaiyavarman Virapandya. It records the sale of lands as *tirunamattukkani* by the members of the *sabhai* to the Adichandesvaradevar of the temple of Urbagankondaruliyanayanar at Iraiyanaraiyur alias Cholakerala-chaturvedimangalam, a *brahmadeya* village in Paranurkkurram in Malanadu alias Jananathavalanadu as the taxes due on their lands could not be paid. It is stated in the inscrip tion that they had once run away but *tanattar* of the temple could manage to collect the taxes. It also mentions that the members of the *sabhai* were brought back and forced to sell their lands in lieu of the tax due from them.

31. Chola Inscription, Kankuduttavanitham, District Thanjavur.— An incomplete Tamil inscription in characters of the twelfth century AD is engraved on the south wall of the Nayanavaradesvara temple. Dated in the seventh regnal year (AD 1184-85) of the king Vira-rajendra (i.e. Kulottunga III) this record states that deed was executed in favour of the deity Adichandesvaradeva of the temple by Nallur-Udaiyan Iraman Sri Kayilasam Udaiyan a native of Alattangudi, a hamlet of Jayatungach-Chaturvedirnangalam, a brahmadeya village in Man-gala-nadu in Arumolideva-valanadu, for the lands granted, after acquiring this from several persons (whose names are specified) to the deity Pugalabharanesvaram-Udaiyar consecrated by him.

32. Pandya Inscription, Kankuduttavanitham, District Thanjavur.—This inscription, in Tamil language and alphabet, engraved on the north wall of the Nayanavaradesvara temple in the village belongs to the 36th year of Maravarman Kulasekhara I. It records the purchase of lands and the grant of the same to the Nachchiyar Devattambirattiyar in the temple of Puga-labarnisvaramudaiyar by the temple officials in Alattangudi in Jayadhara alias Jayatunga chaturvedimangalam, a brahmadeya village in Mangala nadu a subdivision of Arumoli deva-valanadu. The inscription also states that lands were purchased earlier during the reigns of the following kings in chronologial order: (1) Maravarman Kulasekhara I, year 36, (2) Sundara Pandya, year 3, (3) Vikrama Pandya, year 3, (4) Vira Pandya, year 24, (5) Sundara Pandaya, year 17, (6) Sundara Pandya year 3.

33. Pandya Inscription, Sukkara Varakattalai, District Thanjavur.—The inscription from a Siva temple, in Tamil language and characters of the thirteenth century, is dated in the twenty-first regnal year (AD 1354-55) of the Prince Maravarman Virapandya. It records the sale of three *Ma* of land by Madanamangalam-Udaiyan Nayanipillai, who had *kani* rights in the village Attippakkam, which he had obtained as s(t)ridanam from his father-in-law Mukandanudaiyan for the deity Adichandesvaradeva in the temple of Tiruvattisuram-Udaiyanayanar of Jananadan Attippakkam in Panaiyur-nadu in Kulottungasola-Valanadu.

UTTAR PRADESH

34. Gahadavala copper plate charter, Gorakhpur, District Gorakhpur.— This charter in Sanskrit language and Nagari characters, is now preserved in the Department of Ancient Indian History, Archaeology and Culture, University of Gorakhpur, dated in Vikrama 1176 (AD 1120). The copper plates belong to the reign of the Gahadavala king Govindachandradeva. They record the royal grant of a village to the brahmana Thadhirisarman.

35. Pedestal Inscription, Sarnath, District Varanasi.—This inscription in Sanskrit language and Brahmi characters of about the fourth-fifth centuries AD on the pedestal of a mutilated image, found in the vicinity of the Archaeological Museum records its installation by Guhasvamin.

Arabic and Persian Inscriptions[1]

ANDHRA PRADESH

1. Epigraph, Machilipatnam, District Krishna.— The epigraph records the construction of a mosque on the site of a tavern (i.e. Mai-Khana) in the time of Muhammad Amin in A.H. 1023 (AD 1614-15) by Ali Khan Baig.

2. Epitaphs, Machilipatnam, District Krishna.— These epitaphs record the death of Haji ‘Imadu’d Din Muhammad andhis son Mirza Muhammad Ismail in AH 1206 (AD 1791-92) and AH 1232 (AD 1817) respectively.

3. Epitaph, Machilipatnam, District Krishna.— The epitaph composed by Azhar mentions the name of dadi Muhammad Murad who died in AH 1248 (AD 1832-33).

4. Epitaph, Pedana, District Krishna.— This epitaph records that Muhammad Aga, the slave of Shah Wilayat was born in AH 1010 (AD 1601-02) and died in AH 1028 (AD 1619). It also contains another date, viz., AH 1029 (AD 1619-20) probably the date of setting up of the

[1] Information from : N.M.Ganam who assisted by M.F.Khan, S.S.Hussain, M.Y. Quddusi and M.I.Quddusi; except 26, W.H.Siddiqui of Building Survey Project of the Survey.

slab. (Annual Report on South Indian Epigraphy 1917, Appendix B, No. 840).

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5. Inscription, Ahmadabad, District Ahmadabad.— A metrical inscription composed by Wahid records the construction of a tomb of 'Abdur'—Razzaq in AH 1219 (AD 1804-05) by his son.

6. Inscription of the Mughals, Ahmadabad, District Ahmadabad.— The inscription records the construction of the mosque 'Quwwatul-Islam' stated to have been situated in the locality called Tilamdi-chakla on the main road in the fifteenth regnal year (of Akbar Shah II) corresponding to AH 1236 (AD 1820). It also mentions Sayyid Ahmad and Shah 'Abdu's-Sattar (sons of) Miyan Sahib probably as builders of the mosque.

7. Inscription of Sultans of Gujarat, Ahmadabad, District Ahmadabad.— A fragmentary inscription of Ahmad Shah III from Ahmadabad, records the construction evidently of a mosque in AH 962 (AD 1555), and the name of a saintly person, Shah Dusa, who appears to be a builder.

8. Khalji inscription, Mahudha, District Kheda.— This metrical record of the reign of Qutbud-Din Mubarak Shah I, found at Mahudha (Mundhar in the text) (pl. 74) records the construction of a Jami Mosque in AH 718 (AD 1318) during the governorship of Ulugh Qutlug Zafar Khan by Muhammad son of Mahmed under the supervision of Husain Dad-Bek (i.e. Judicial officer) of the town.

9. Epigraphs, Vadodara, District Vadodara.- An epigraph dated AH 1213 (AD 1798) records the endownment of one kumba of land to an attendant (*khadium*) of the mosque (name not mentioned).

10. Epitaphs, Vadodara, District Vadodara.— A few epitaphs recording the death of persons were found at Vadodara. A fragmentary epitaph mentions the death of Sayyid Taj-aud-Din in AH 1120 (AD1708-09). The second one from the same place records the death of Hakim (i.e. Physician) Sayyid Akmal Khan who had come from Bareilly and lived at Baroda (i.e. Vadodara). The third inscription places the death of Muhammad Amin, a renowned nobleman. The last one places the date of commencement of the construction of the tomb of Muhammad Amin in AH 1251 (AD 1835-36) and completion in AH 1253 (AD 1837-38).

MAHARASHTRA

11. Miscellaneous Inscription, Gopalpur, District Sholapur.— The inscription records the construction of a bridge by Raja Nanak Bakhsh Raja Bahadur in A.H. 1255, Saka 1761,

Samvat 1896, AD 1839.

RAJASTHAN

12. Inscriptions, Dausa, District Jaipur.— The record from Dausa, states that a Jami mosque was built by Shaikh Inayatullah Amin in A.H. 1100 (1688-89 AD) in the reign of Alamgir (i.e. Aurangzeb) when the province of Dausa (Dausa) was held by the prince (name not mentioned). According to another epigraph from the same place, the *nisba* of the builder is mentioned as Jaunpuri (i.e. of Jaunpur).

13. Epitaph, Newai, District Sawai Madhopur.— An epitaph from Newai states that 'Izzatullah Baig entitled Tirandaz Khan, suffered martyrdom in a battle in AH 1147 (AD 1734-35).

14. Inscriptions of the Mughals, Toda Bhim, District, Sawai Madhopur.— A much damaged epigraph records the construction of a well during the reign of Jalalud-Din Muha mmad Akbar by Muhammad Abu'lFath son of Muzaffar Khan Mughal; its date is illegible. A new record also from the same place, assigns the construction of a mosque to Khwaja Farman in the sixth regnal year of Shah Jahan corresponding to AH 1044 (1634-35 AD).

15. Miscellaneous Inscriptions, Toda Bhim, District Sawai Madhopur.— An epigraph recording the construction of a tomb of Nawab Muzaffar Khan Mughal's mother in AH 982 (AD 1574) was found from Toda Bhim.An undated inscription assignable to the sixteenth century from the same place, records the construction of a tomb of the mother of Nawab Khan Muhammad Abul-Fath.

16. Inscriptions of the Nawabs of Tonk, District Tonk.— Of the two epigraphs of the time of Nawab Amirud-Daula Muhammad Amir Khan one records that a mosque was constructed in AH 1226 (1811-12 AD) by one Mahmud. Another epigraph also refers to the construction of a mosque in AH 1231 (1815-16 AD) by Mir Jamaiyat Ali, son of Mir Babar Ali, son of Mir Ahmad Ali, a native of Itawa.

UTTAR PRADESH

17. Epitaph, Mauaima, District Allahabad.— A metrical epitaph registers the death of Fayyad who was Faidi of his time and Allama of his age; its chronogram was composed by Afdal.

18. Miscellaneous inscriptions, Mauaima, District Allahabad.— These inscriptions record the construction of mosques at different dates by different men. The first one assigns the construction of a Jami Mosque to Mujahid in AH 1132 (AD 1719-20). Two more identical

epigraphs from the same place, record the construction of a mosque in AH 1190 (AD 1776-77) by Muhammad Danish. Of these two inscriptions, one is written by Muhammad Yasin.

19. Tughluq Inscription, Mauaima, District Allahabad.— This is a fragmentary inscrip tion of Ghiyathud-Din Taughluq Shah I, recording the construction of a mosque.

20. Bilingual inscription of Firuz Shah Tughluq, Lorepur, District Faizabad.— Dated AH 782 (1380-81 AD) this bilingual inscription records that one Taj Farid (?) rehabilitated the town Sanjholi (or Sinjhauli) which was lying desolate, constructed a tomb, a cistern and laid out a garden around it and planted fruitbearing trees. The record further furnishes the infor mation that all the land in the vicinity of the town Sanjholi belonged to Daulat Shah who constructed mosques, wells, cisterns, a tomb for himself, and laid out gardens in different plots of land and also excavated the canal in the twenty-four bighas of land which was his property and named it Qadi Badh. He also populated the village (name not legible) and named it Tajpur. Daulat Shah endowed the revenue of the whole land after the payment of 'Ushr-i-Doabi' tax as levied on land in the provinces of Doab) for meeting the expenditure on repairs of mosques, wells, cisterns, tombs as also on food for the Imams, muezzins, carpet spreaders on oil for lamps and carpets. The epigraph written by Hyas bears another date viz. AH 783 (1381 AD) which is probably the date of setting up of the slab.

21. Inscriptions of the Mughals, Ayodhya District Faizabad.— An epigraph of the time of Shah Alam II records the construction of a lofty mosque in AH 1200 (1785-86 AD) by Amrud-Daula when he became the Naib (Deputy) of Wazir-i-Mamlikat Yahya Khan.

22. Inscription of the Nawabs of Avadh, Faizabad, District Faizabad.— According to this record a mausoleum of Haji Iqbal Khan Khwaja Sara (emmuch) was constructed in AH 1174 (AD 1760-61) during the governorship (Nazim) of Nawab Shuja (ud-Daula), son of Safdarjung, under the supervision of Khuda duli, at the instance of Hadrat Begam, the mother of the Nawab—the expenditure for which was met by the treasury.

23. Inscription, Ayodhya, District Faizabad.— This inscription states that a mosque was constructed by Zabardast Khan during the time of Nawab Wazir Asaf-(ud-Daula) in AH 1207 (AD 1792-93).

24. Miscellaneous Inscriptions, Ayodhya, District Faizabad.— Two epitaphs record the death of Faridun Khan Birlas and Abdur Rahim Sultan in AH 1023 (AD 1614-15). According to another epitaph from the same place, Nawab Mirza Mehr Ali Birlas son of Faridum Khan Birlas died in AH 1028 (AD 1618-19). An epitaph from Ayodhya mentions the demise of Mirza Nur Baig in AH 1181 (AD 1767-68).

25. Inscription, Rasulpur Dargah, District Faizabad.— An inscription from Rasulpur-

Dargah states that a mosque was constructed in the Khanqah in AH 1067 (AD 1656-57) by a person named Shafsiya.

26. Razi Nama, Sambhal, District Moradabad.— This document is a joint representation to the Mughal emperor from the Muslims of Sambhal (pl. 75) which records that Muhammad Iwaz and the entire muslims of the city of Sambhal have agreed that since Sheikh Muhammad Azam and Shaikh Muhammad Kazim were very learned and pious persons, the assignment of Mufti of the area be confirmed on them. The document is important as it bears the seals and signatures of the local eminent persons and highlights the importance of local people in matters of such appointments by the Mughal emperors. The document also contains the signature of Muhammad Afzal, the imam of the Jami Masjid at Sambhal. This Razi Nama bears the symbols of the signatures of N'matullah mihtar-i-mimaran (leader or chief of the architects), Da ud, Sarudgaran (musician), Ashraf, mihtar-i-bafan (chief of the weavers), Jauhar, mihtar-i-Kamangaran (chief of the bow makers), Madan, mihtar-i-tabakhan (chief of the cooks), Khalu, mihtar-i-hammaman (chief of the bath givers), (name illegible) mihtar-i-Kalalan (chief of the manufacturers and sellers of utensils).

The seal of Muhammad Iwaz bears the date AH 1095 (AD 1683-84) which falls during the reign pf Aurangzeb.

27. Epigraphs, Dilerganj, District Pratapgarh.— This damaged epigraph records the construction of a mosque by Taj Khan in AH 1023 (AD 1614-15).

28. Miscellaneous Inscriptions, Manikpur, District Pratapgarh.— The epitaph written by Mulla Mubarak (son of) Mulla Alam states that Mir Tufan won paradise fighting against the infidels.

NUMISMATICS AND TREASURE TROVE[1]

GOA, DAMAN AND DIU

1. Copper coin, Mehtawari, District Diu.— A circular copper coin of a Muslim ruler was collected as treasure trove from an ancient mound in the vicinity of the village.

GUJARAT

2. Copper coins, Patan, District Mahesana.— Two copper coins of Muslim rulers were collected from Patan.

MADHYA PRADESH

3. Silver coins, Basai, District Datia.— Nine silver coins assignable to *circa* tenth century AD were discovered from Basai in Datia.

4. Silver coins, Burhanpur, District East Nimar.— During the excavation for the foundation of a house thirty-one silver coins of Muslim period were discovered (pl. 76) as treasure trove.

5. Silver coins, Jobot, District Jhabua.— Eighty-six silver square coins of the Sultans of Malwa were recovered from the village Jobot.

6. Silver coins, Badhbaha, District Khargone.— A hoard consisting of four gold and forty-six silver coins of the Mughals have been discovered as treasure trove.

7. Gold coins, Tulsipur, District Raisen.— Thirty-six circular gold coins bearing the legends of the Paramara and the Chandella rulers were found as treasure trove.

8. Copper coins, Bhoramdeo, District Rajnandgaon.— A hoard of two thousand, two hundred and one coins-issues of Ala-ud-din-Khilji were found as treasure trove.

9. Silver coins, Vidisa, District Vidisa.— Out of three hundred and forty-five silver

[1] Information from : 1 and 2, the Western Circle of the Survey; 3, 5 to 9, Director of Archaeology and Museums, Madhya Pradesh; 4, the Central Circle of the Survey; 10, Central Museum, Nagpur; 11, Shobhana Gokhale of Deccan College Postgraduate and Research Institute, Pune; and 12 and 14, the Eastern Circle of the Survey.

Mughal coins recovered, two hundred and eighty-six are of Akbar while fourteen belong to Jahangir.

MAHARASHTRA

10. Bronze images, Hamalapuri, District Nagpur.— Three bronze images of Buddha assignable to *circa* sixth century AD were discovered as treasure trove from a field in Ramtek tehsil.

11. Satavahana coins, District Nasik.— Satavahana coins consisting of silver issues of Gautamiputra Satakarni, Vasisthiputra Satakarni and electrum coins of Sri Satakarni and Kochiputra Satakarni were found at Nasik. The silver coins bear Ujjain symbol with horse and elephant motifs. Electrum coins of Sri Satakarni contain effigy of an elephant with uplifted trunk, Ujjain symbol and a legend *Ratio Siri Satakarni* on the obverse. While those of Kochi putra Satakarni bear an elephant with uplifted trunk and a legend *Rano Siri Kochchiputra Satakarni* on the obverse and a tree in railing on the reverse.

TRIPURA

12. Silver coins, District Agartala.—Twenty-two silver coins issued by the Hyas Shahi dynasty of Bengal were acquired as treasure trove.

WEST BENGAL

13. Silver coins, Dubra, District Nadia.— Twenty silver coins of the Muslim rulers were acquired as treasure trove.

14. Silver coins, Shikarpur, District Nadia.- Eighty-two silver issues of the British rulers were acquired as treasure trove.

OTHER IMPORTANT DISCOVERIES

ANDHRA PRADESH

1. Inscriptions and Sword, Amaravati, District Guntur.— The Archaeological Museum Amravati, of the Survey acquired six inscribed lime stone slabs with Medieval Telugu inscrip tions from the Lord Amaralingeswara temple. An iron sword belonging to Medieval period was recovered from the Amaravati stupa area.

2. Palaeolithic and Megalithic site, Srisailam, District Kurnool.— I.K. Sarma of the South-eastern Circle of the Survey and V. Anuradha, a research scholar of Nagarjuna Univer sity, Guntur discovered Palaeolithic hand-axes and cleavers, flake-tools of quartzite and Mega lithic cairn-circles near Sarangamatham on Srisailam hills.

3. Sculptures, Srisailam, District Kurnool.— I.K. Sharma of the Temple Survey project (South), of the Survey noticed sandstone sculptures of Saptamatrika and Yoganarasimha, assignable to the early Chalukyan period (seventh-eighth century AD) in the compound of the famous Mallikarjuna Siva temple.

DELHI

4. Palaeolith, New Delhi.— B.M. Pande of the Western Circle of the Survey made a chance discovery of a late Acheulian hand-axe on the hill top in the Jawaharlal Nehru Uni versity campus in south Delhi.

5. Medallion, Delhi.— W.H. Siddiqui of the Survey noticed an interesting iron medal lion on the rear wall of a 18th century mosque in the Dariba Kalan of Shahjahanabad. It is designed in the form of a huge disc representing the sun with its beams, painted in gold. The medallion has an Arabic inscription in elegant Naskh script, quoting the Quaranic verse purporting that “sijda or prostration is only due to Allah and not the sun and the moon”, (pl. 77).

GO A, DAMAN AND DIU

6. Medieval sculptures, Diu, District Diu.— Narayan Vyas, M.D. Puranik and A.R. Shah of the Western Circle of the Survey and S.K. Jain, the Collector and Civil Administrator of Diu, discovered sculptures belonging to the late Medieval period in a modern temple in Diu

town.

7. Rock-cut caves, Nayasimar, District Diu.- Narayan Vyas, M.D. Puranik and A.R. Shah of the Western Circle of the Survey and S.K. Jain, the Collector and Civil Administrator of Diu, discovered seven rock-cut caves, *kunda* and a well in the vicinity of village Nayasimar near the sea-shore. These caves were of the early Christian era.

GUJARAT

8. Late Medieval sculptures, Kumbaria, District Banaskantha.— Narayan Vyas and A.R. Shah of the Western Circle of the Survey discovered a number of late Medieval sculptures (pl. 78, 79) such as the seated Siva Umamahesvara and Brahma-Brahmani.

9. Medieval pottery, Taranga Hill, District Mahesam;.— Narayan Vyas and A.R. Shah of the Western Circle of the Survey collected Medieval pottery from the fortified area and rock-shelters, near Taranmata temple and Jogida Gupha.

10. Medieval sculptures, Wadodar, District Rajkot.— Narayan Vyas and A.R. Shah of the Survey discovered a number of sculptures and architectural fragments belonging to the late Medieval period. One of the sculptures, a naga image, had a sixteenth century inscription engraved on both the sides.

11. Microliths, Ganespura, District Vadodara.— T. Satyamurthy and K.Veerabhadra Rao of the Western Circle of the Survey noticed a site containing microliths.

12. Medieval sculptures, Goraj and Mahadeopura, District Vadodara.— B.M. Pande of the Western Circle of the Survey and U.P. Shah noticed a number of sculptures belonging to the early and late Medieval period. Noteworthy among them were Gaja-Lakshmi, Mahisasuramardini, Saptamatrikas, Nandi, Siva, Ganesa, etc.

13. Sculptures and Mound, Vadiapura, District Vadodara.— T. Satyamurthy and K. Veerabhadra Rao of the Western Circle of the Survey, discovered a number of Medieval sculptures and a mound with brick structures in the vicinity of the village.

HIMACHAL PRADESH

14. Sculptures, Dohgi, District Una.— The State Museum, Government of Himachal Pradesh, discovered five sculptures of late Gupta and Pratihara styles, the period ranging from late seventh century to eleventh century AD. The average height of the sculptures was one metre. All the sculptures were brought to Himachal State Museum, Simla.

MADHYA PRADESH

15. Rampart and Sculptures, District Bastar.— S.S. Yadav of the Directorate of Archaeology and Museums, Government of Madhya Pradesh discovered a mud rampart at Bhairagarh and a few sculptures belonging to Yogini cult.

16. Temple, Sculptures and Chhatri, District Bhind.— Sadhna Nayak and R.R. Singh of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, discovered a Medieval temple and sculptures, (pl. 80) and a *Chhatri* of Maratha period.

17. Sculptures, District Bhopal.—C. Krishna and R.R. Singh of the Directorate of Arch aeology and Museums, Government of Madhya Pradesh, surveyed the village Behta and Lahukhedi on the bank of Bhopal Upper lake and discovered a group of sculptures belonging to Pratihara period, including Umamaheswara, Brahma, Lakshmi-Narayan, (pl. 87) Bhairava and Fertility goddess.

18. Kayatha ware, terracotta figurines, District Dewas.— M. Umamaheswara Rao of the Central Circle of the Survey explored twenty-two villages on the bank of the river Kalisindh and noticed eight sites yielding Kayatha ware, black-and-red ware and terracotta figurines (pl. 81).

19. Copper plates, Bagh, District Dhar.— Twenty-eight inscribed copper plates in Gupta Brahmi characters were deposited with the curator, State Museum, Indore, by the station officer, police station, Bagh. The copper plates were discovered by an adivasi while he was plouging his field.

20. Rock-cut-sculptures, Gaderna, District Guna.— H. Michael of the Central Circle of the Survey rediscovered rock cut sculptures of Pratihara period carved in relief on the cliff face and inscriptions in early Devanagari. The sculptures belong to the Brahmanical and Jaina pantheon. They were first reported in 1924-25. (pl. 82).

21. Silver coins, iron swords, Bilheri, District Jabalpur.— Sixty-three silver coins (pl. 83) along with a copper pot and six iron swords were discovered while digging for the founda tion of a house. They were handed over to the Central Circle of the Survey.

22. Temple remains and sculptures, District Mandla.— B.P. Singh of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, discovered the remains of a temple and Medieval stone sculptures of Ambika and Durga from Kudmali and of Vishnu from Jhulpur.

23. Rock shelters, District Mandsaur.— V.S. Wakankar of Ujjain and Bharati Joshi of the

Directorate of Archaeology and Museums, Government of Madhya Pradesh, discovered a group of rock shelters at Deccan in Mandsaur District. The rock paintings were assigned to Meso-lithic and to Historic periods.

24. Rock shelters and temple remains, District Raisen.— Sadhna Nayak, and O.P. Misra, of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, explored the Mogha Valley and discovered painted rock shelters of the Chalcolithic and historic periods and the remains of a temple of Medieval period.

25. Medieval sites, District Raisen and Sagar.— G.L. Raikar, of the Directorate of Archaeology and Museums, Government of Madhya Pradesh during the survey of Bina Com plex, noticed a number of Medieval sites in the catchment area.

26. Inscription, Viharkotra, District Rajgarh.— Jitendra Tripathi, a research scholar, discovered a Brahmi inscription of 'Narvarman' Aulikara King (pl. 84).

27. Temple, Madhpha, District Rewa.— Lalchand Singh and P.K. Mishra of the Central Circle of the Survey discovered a temple comprising three shrines (square sanctum sanctorum) and a rectangular pillared *mandapa* and a centrally located portico of the late Gupta period. The temple was raised on a low moulded basement.

28. Remains of Stupas, inscriptions and Rock shelters, District Rewa.— V.P. Nagaich, of the Directorate of Archaeology and Museums, Government of Madhya Pradesh discovered stupas, etc. A few mounds bearing the remains of Buddhist Stupas, carved stone structures, inscriptions and a group of painted-rock-shelters have come to light at a distance of 10 km from Katra on Rewa-Allahabad road.

29. Stupas, Megalithic Remains, Inscriptions, Madighat, Teonthar, District Rewa.— P.K. Misra, of the Central Circle of the Survey discovered the remains of stupas (pl. 85) and Mega lithic remains, Prehistoric rock-shelters with paintings and two inscriptions of 3rd or 2nd century BC (pl. 86). One of the inscription reads as "*tikningutas*" and the other as "*sukarik sile*".

30. Medieval structure and temple remains, District Sagar.— G.L. Raikar and R.R. Singh of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, discovered a Medieval structure and temple remains from Mad-Piparia and *Ekmukhlinga* of sixth century AD.

31. Sculpture and inscription District Satna.— V.P. Nagaich of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, surveyed the Ban-Sagar submer sion area and noticed a group of Kalchuri sculptures in different villages, a pillar inscription of

the Gupta period at Madakara and a small temple near village Donga.

32. Early Historical site, District Sehore.— C. Krishna, and R.R. Singh of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, during exploration noticed a historical fort at Ginnoregarh, fortification wall belonging to later period, and ancient ponds. The architectural members such as medallions, sculptures (pl. 87) and arches are found to have been reused in the fort.

33. Medieval temple, District Sehore.— C. Krishna, G.K. Chandrol and R.R. Singh of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, discovered Medie val temple remains and a few stone sculptures of late Medieval period at the village Sirodi.

34. Rock shelter, Udayagiri, District Vidisa.— D.K. Sinha and A.P. Sagar of the Central Circle of the Survey noticed a rock-shelter with a few paintings. A few Mesolithic artifacts were also recovered from the surrounding area.

MAHARASHTRA

35. Medieval temple and structures, Talegaon Dashasar, District Amaravati.— T.M. Kesava of the South-western Circle of the Survey noticed a Kesava temple of Yadava period which had been renovated during the Maratha period. Further, he reported that the village Talegaon Deshasar has innumerable sculptures of Yadava period, including icons of Vishnu, Garudavahana Vishnu, Uma-Maheshawara, Narsimha, Indra, Mahisasuramardini, Ganesa and Varaha with devotees.

36. Brahmanical Cave, Medieval cistern, Betalwadi, District Aurangabad.— Amarendra Nath and P.V. Shastri of the South-western Circle of the Survey, located a Saiva cave, locally known as Rudreswara. It was situated a kilometer south-west of Betalwadi, in Shegaon Taluk anddateable to the Medieval period. The adjacent shrine has a Saptamatrika panel *in situ.*

A rock-cut water cistern measuring 9 x 7 m was also located. It was rectangular in shape, had chisel marks and four pillars to support the overhead rock-mass. On two back pillars sockets were chiselled out.

37. Palaeolithic site, rock-cut caves, Vadi, District Aurangabad.— T.M. Kesava of the South-western Circle of the Survey discovered Middle Palaeolithic tools comprising of side scraper and end-scraper on jasper. He also discovered an unfinished Buddhist cave of Vakataka period with unique architectural features. The cave had *agarbha-griha* and a pillared verandah. The unfinished *garbha-griha* has an ornate doorway. There was a stupa carved in low relief on the lintel. The pillars of the verandah had square base, fluted shaft surmounted by bulbous cushion capital topped by square abacus. The capital was bedecked with dwarf human figures.

On either side of the verandah there were two additional chambers.

38. Medieval stupa, Shivaji Park, Dadar, District Bombay.— In the course of the foundation digging, a monolithic stupa decorated with lotus in relief at the apex and a seated male figure in dhyana was examined by Amarendra Nath and K.V. Kulkarni of the South-western Circle of the Survey. Stylistically it belongs to the Yadava period.

39. Medieval temple, Marol, District Bombay.— Amerandra Nath and K.V. Kulkarni of the Southwestern Circle of the Survey, noticed the plinth stones of a *garbha-griha* of a Medieval temple when the foundation digging was in progress. From the digging six bracket-figures (kichaka) and two lotus medallion carved in relief were noticed.

40. Sculptures, Junsurla, District Chandrapur.— K.P.S. Badoria of the South-western Circle of the Survey noticed several Brahmanical sculptures of Ganesa, Umamaheswara and Vishnu.

41. Inscriptions, Ramtek, District Nagpur.— The Central Museum, Nagpur during the course of cleaning the walls of the Narsimha temple at Ramtek noticed two inscriptions on the decorated pillars of the *garbha-graha* and one on the southern wall of the *mandapa* (pl. 88. 89). On the basis of these inscriptions now, the temple could definitely be dated to fifth to sixth century AD.

42. Sculptures, around Ramtek, District Nagpur.— The Central Museum, Nagpur noticed and collected stray pieces of sculptures made of red stone from Nagardhan and Hamalpuri in Ramtek Taluk.

43. Rock-cut Caves, Anjaneri, District Nasik.— T.M. Kesava of the South-western Circle of the Survey located two groups of Jain caves to the west of Anjaneri village, one was dedi cated to Parsvanatha and the others were unfinished. The caves are datable to the Yadava period.

44. Medieval inscription Toramba, District Osmanbad.— T.M. Kesava of the South western Circle of the Survey noticed an inscription on a pillar. A *nandi* figure was at the top of a square pillar which was having inscriptions on three sides. There were 28 inscribed lines in Devanagari script and the language was Sanskrit.

45. Throne-plinth, Raigad Fort, District Raigad.- While removing earth from the throne plinth, located in the coronation hall at Raigad fort, Amarendra Nath, K.P.S. Bhadoria and L.J. Kulkarni of the South-western Circle of the Survey noticed two courses of shaped rubble structure in lime masonry. Other than lime, chips of stones were also used to maintain the plumb-line. The lower course was of three rectangular dressed slabs, whereas the upper course was of three undressed stones. Since the L-shaped structure was located within the existing

throne-plinth, the same may form part of an earlier throne-plinth.

PONDICHERRY

46. Ancient site and temple, Melsathamangalam, Pondicherry.— C.L. Suri assisted by P. Narayana Babu and P.R.K. Prasad of the Southern Circle of the Survey scraped a section of an highly disturbed ancient site situated in the midst of the village Melsathamangalam, 10 km west of the famous Arikamedu site. The results of the section scraping proved to be very interesting. In the upper levels it yielded rouletted wares, a few fragments of amphorae and arretine ware of thin section associated with black-and-red ware of typical Megalithic period, and black-and-red slipped wares. The floor levels composed of rammed earth were encountered in various levels indicating that it was essentially a habitational site. The cultural deposit was preceded by a deposit yielding hand-made red ware with a Neolithic axe. The temple remains were also exposed. The temple was enclosed by a huge brick-built wall (pl. 90) with a flight of steps provided on the east to reach the sanctum. There was Sivalinga with Yonipatta on the surface of a later period. But the large sized bricks measuring 36 x 28 x 5 cms suggested that the temple may belong to the early period. A sculpture of Vishnu (pl. 91) assignable to the Chola period was also noticed.

RAJASTHAN

47. Historical site, Pushkar, District Ajmer.— R.D. Singh and Narayan Vyas of the Western Circle of the Survey noticed a site about 2 km west of the Pushkar. The main pottery types consisted of dish, bowls and vessels.

48. Sculptures, Gohandi, District Jaipur:— Narayan Vyas and K.T. Karamchandani of the Western Circle of the Survey discovered a number of late Medieval sculptures.

TRIPURA

49. Medieval stupa, Bakshanagar, District West Tripura.- B. Bandyopadhyay of the Eastern Circle of the Survey noticed a stupa of the early Medieval period.

UTTAR PRADESH

50. Sculptures, Nagar, District Agra.- L.M. Wahal of the Northern Circle of the Survey noticed one *Pancayatana* Siva Linga representing Ganesa, Vishnu, Parvati and Surya on the four sides of the Central Siva Linga, assignable to the Medieval period.

51. Inscription, Gorakhpur, District Gorakhpur.— A historically important Arabic

inscription of Alaud-Din Husain Shah of Bengal was discovered by W.H. Siddiqi of the Survey from the entrance gate of the Imambara (pl. 92) of Miyan Sahib at Gorakhpur. Written in elegant *thulth* script of Bengal variety it quotes the famous saying of the Prophet and records the date of the erection of a mosque in AH 920 (AD 1514-15). The ruined plinth of this mosque is still extant in the spacious enclosure of the Imambara of late eighteenth century.

52. Medieval sculpture, Makanpur, District Kanpur.— L.M. Wahal of the Northern Circle of the Survey discovered several architectural remains, pedestals of Jain images and the Medie val terracottas.

53. Medieval sculptures, Adinga, District Mathura.— L.M. Wahal of the Northern Circle of the Survey noticed an image of Revanta on the corner of the mound in a modern Mathia. Door jambs, lintels and pieces of stone sculptures were also noticed.

WEST BENGAL

54. Sculpture, Mahanad, District Hughly.— A Mutilated (headless) stone sculpture of twelve-armed Siva in his Ananda-Bhairava or Natesa form in a pose of cosmic dancer, of Nataraja in *lalita* pose, not on the bull but on the *visvapadma* was noticed. The sculpture appears to have been influenced by the plastic art of Orissa which flourished at Khiching in early Medieval times.

55. Sculptures, Purvadaha, District Jalpaiguri.— N.C. Bhattacharya and A.K. Karmakar of the Directorate of Archaeology, West Bengal, collected nine miniature stone sculptures envisaging a two-armed seated Lokesvara, a four-armed seated Visnu, four-armed Ganesa, a two-armed seated Gaja-Lakshmi, a four-armed seated Tripurabhairavi or Bhuvaneswari, all dateable to circa eleventh to twelfth century, and one square votive stone plaque of circa twelfth century AD four stone Gauripattas with stone lingams ascribable to the Medieval period and one silver foil depicting Durga-Mahishasuramardini, ascribable to circa seventeenth century AD from the precincts of the medieval temple of Jatilesvara-Siva at Purvadaha.

56. Stone sculpture of Vishnu, Sonarpur, District 24-Parganas.— S.C. Mukherji, and A.K. Karmakar of the Directorate of Archaeology, West Bengal, discovered a four-armed image of Vishnu from Ukhila Paikpara of Narendrapur. The sculpture, made of black basalt, was carved in high relief with the central portion in the round, 1 m high and stylistically it may be ascri bed to *circa* eleventh century AD.

RADIOCARBON DATES

Radiocarbon dates estimated[1] from archaeological and Quaternary samples[2] are presented in the following pages. The dates were determined at the Physical Research Laboratory, Ahmedabad. All the dates are based on 5730±40 years half-life value of radiocarbon. 1950 is the base year to convert these dates into BC/AD scale. All the dates are uncorrected for 14C/12C variations. The sites are arranged Statewise and alphabetically.

ANDHRA PRADESH

1.	Huli Kallu, District Anantpur PRL-633. Neolithic deposits; charcoal Locus: Trench 4, Layer 5, depth 0.87 m.	2970 ±150 (1020 BC)
2.	Ramapuram, District Kurnool PRL-761. Chalcolithic deposit charcoal; Locus Qd, Trench XA; depth 0.50 m. Sample no. GS-17.	710 ± 110 (AD 1240)
	PRL-762. Chalcolithic deposit; charcoal; Locus: Qd III, Trench XB Layer 5, depth 0.9 m	3910 ±110 (1960 BC)
	PRL-768. Chalcolithic deposit; Charcoal; Locus: Qd III, Trench XB; Sample No. CS-5	880 ±130 (AD 1070)
3.	Veerapuram, District Kurnool PRL-725. Megalithic deposit (?); charcoal; Locus: Trench B11, Layer 9; depth 1.7 m.	1830 t 140 (AD 120)
	PRL-727. Megalithic deposit;	2150 ± 150

[1] Contributed by D.P. Agrawal, R.V. Krishnamurthy and Sheela Kusumagar of the P.R.L. For furtherdetails of the sample, the submitting organisations may be contacted.

[2] Samples submitted by : 1, Department of Archaeology and Museums, Hyderabad; 2,16,Archaeological Survey of India; 3, Birla Archaeological and Cultural Research Institute, Hyderabad; 4, Dibrugarh University; 5, Geological Survey of India; 6, University Museum, Philadelphia; 7,8,10, Physical Research Laboratory, Ahmedabad; 9,11,12,13, National Institute of Oceanography, Goa; 14, Deccan College Postgraduate and Research Institute, Pune; 15, Department of Archaeology, Bhopal; 17, Australian National University; 18, 19, Banaras Hindu University; 20, Garhwal University and 21, Delhi University.

charcoal; Layer 10; depth 2.3 m.	(200 BC)
PRL-728. Megalithic deposit;	
charcoal; Locus: Trench C13	2950 ± 140
Layer 12; depth 3.04 m.	(1000 BC)
PRL-729. Megalithic deposit,	
charcoal; Locus: Trench B14	2920 ±150
Layer 14; depth 3.10 m.	(970 BC)
PRL-730. Megalithic deposit;	
charcoal; Locus: Trench B14	3240 ± 140
Layer 15; depth 3.40 m.	(1290 BC)

ARUNACHALPRADESH

4.	Namphuk, District Tirap	
	PRL-539. Neolithic deposit (?)	19870 ±920
	charcoal; Trench I and II;	
	depth 0.15 m.	(17920 BC)
5.	Kumbharia, District Banaskantha	
	PRL-549. Ancient mining area deposit	700 ± 120
	charcoal; Sample No. 8.	(AD 1250)
6.	Oriyo Timbo, District Bhavnagar	
	PRL-876; Lustrous red-ware (Rangpur III)	4210 ± 160
	deposit; charcoal; Trench F 2, Layer 3;	(2260 BC)
	depth 0.25 m, Sample No. 6096.	
	PRL-886. Lustrous red-ware (Rangpur III)	4280 ± 170
	deposit, charcoal; Trench G'3 Layer 3;	(2330 BC)
	depth 0.75 m Sample No. 5045.	
	PRL-889. Microlithic deposit	4860 ±160
	charcoal; Trench F'3, Layer 5;	(2910 BC)
	depth 0.9 to 1 m. Sample No. 10040 and 10043.	
7.	Bhimrana, District Jamnagar	
	PRL-498. Coral	
	Inland coral reef; depth 0.22 m. Sample No. TF-909 A.	31000
	PRL-499. Coral	
	Inland Coral reef; depth 0.22 m.	
	Sample No. TF-909 B.	31000
8.	Kharaghoda, District Kutch	

PRL-497. Holocene deposit (?) Jaw bone of crocodile; Layer A; depth 6.79 m. Sample No. 49 A.	15710 + 600 —560 (13760 BC)

9. Western continental shelf, off gulf of Kutch

PRL-485. Algal limestone. Algal limestone (aragonite); dredged from a water; depth of 78m. Sample No. G 2/29.	12510 + 440 -420 (10560 BC)
PRL-486. Algal limestone. Algal limestone (aragonite); dredged from a water; depth of 173 m. Sample No. G/2/30.	14740 ± 610 —570 (12790 BC)
PRL-487. Coral Coral (aragonite); dredged from a water depth of 25 m. Sample No. G/2/45 (A).	7710 ± 200 (5760 BC)
PRL-488. Algal limestone Algal limestone, Sample No. G 2/45 (b).	4420 ± 170 (2470 BC)
PRL-489. Algal limestone. Algal limestone dredged from a water; depth of 46 m. Sample No. G 2/47 (a).	13850 + 530 —500 (11900 BC)
PRL-490 Limestone Limestone (aragonite) dredged from a water depth of 80 m. Sample No. G/2/61.	9490 + 220 (7540 BC)

JAMMU AND KASHMIR

10. Pythapathan, District Baramula

PRL-816. Aceramic lithic deposit (?) charcoal, depth 3 m Sample No. 1.	4310 ± 150 (2360 BC)

LACCADIVES

11. Storm Beach, District Laccadives, Bitra Island

PRL-481. Dead coral. Dead coral from northern end of Bitra island. Sample No. BR6.	Modern
PRL-482. Dead coral Dead coral from northern end of Bitra island. Sample no. BR 8.	160 ± 120

12. Storm Beach, District Chetlat Island
PRL-477. Dead Coral.
Dead coral from surface, northern end of — 290 ± 90
Chetlat Island. Sample No. CHT-14.
PRL-478. Dead coral
Dead coral from surface, northern end of — 570± 130
Chetlat Island. Sample No. CHT-15.
PRL-479. Dead coral
Dead coral from surface, northern end of — 1670 ± 100
Cheltat island. Sample No. CHT-16.
PRL-480. Dead coral
Dead coral from surface, sourthern end of — 220 ± 190
Chetlat island. Sample CHT-27.

13. Storm beach, District Kiliyan Island.
PRL-483. Dead coral
Dead coral from surface, southern end of — Modern
Kiltan Island. Sample No. KT-17
PRL-484. Dead coral.
Dead coral from southern end of Kilian from the old — 2860 ±110
coral storm beach; depth 0.10 m Sample No. KT-18. — (910 BC)

MADHYA PRADESH

14. Bhimbetka, District Raisen
PRL-534. Late Mesolithic deposit charcoal; Locus; — 2860 ±150
sq. 5, Trench G, Layer 2; depth 0.66 m. — (910 BC)
Sample No. BTK-II B-33
PRL-535. Mesolithic deposit
charcoal; Locus: sq 5, Trench G, Layer 2; — 1190 ±150
depth 0.66 to 0.70 m. Sample No. BTK II B-33. — (AD 760)
PRL-536. Late Mesolithic deposit.
charcoal; Locus sq 5, Trench G, Layer 2; depth 0.61 — 980 ±120
to 0.65 m. Sample No. BTK-II, B-33. — (AD 970)
PRL-787. Middle Palaeolithic deposit
calcium carbonate; Locus: Trench BTK III F; — 15820 + 580
depth 0.86 to 0.9 m. Sample No. BTK-18. — -540
(13870 BC)

PRL-788. Middle Palaeolithic deposit calcium carbonate; Locus: Trench BTK III, F 23, Layer 4; depth 0.81 to 0.85 m. Sample No. BTK-17.	17730 ± 450 (15780 BC)
PRL-789. Mesolithic deposit calcium carbonate; Locus: Trench BTK III, F-23, Layer 2; depth 0.31 to 0.35 m. Sample No. BTK-16.	18180 ±500 —470 (16230 BC)

15. Dangawada, District Ujjain

PRL-686. Malwa deposit carbonised grains; Locus: Trench IV, Layer 9; depth 2.58 m.	3200 ±150 (1250 BC)
PRL-690. Malwa deposit carbonised rice; Locus; Trench VII, Layer 8A, depth 2.20 m.	3500 ±160 (1550 BC)
PRL-691. Malwa deposit charcoal; Locus; Trench VII, Layer 8B; depth 2.30 m.	3290 ±130 (1340 BC)
PRL±692. Malwa deposit carbonised wheat; Locus; Trench VII, Layer 4; depth 2.20 m.	2980 ±150 (1030 BC)

MAHARASHTRA

16. Daimabad, District Ahmednagar

PRL-654. Savalda deposit charcoal; Locus: Trench GZ63, layer House No. 12; Room No. A15 depth 4.10 m Sample No. DMD/42/1977-78.	3560 ±110 (1610 BC)
PRL-656. Jorwe deposit charcoal; Locus; Trench Y2, Kiln No. 1, depth 0.10 m. Sample No. DMD/46/1977-78.	3140 ± 150 (1190 BC)

RAJASTHAN

17. Didwana, District Nagaur

PRL-645. Lake sediment lake mud from DIAL well; Layer: middle 2.07 to 2.12 m.	6170 ±200 (4220 BC)

	PRL-646. Lake sediment lake mud from DIAL well; Layer: bottom of formation III; depth 2.88 to 2.93 m.	6010 ±180 (4060 BC)
	PRL-647. Lake sediment lake mud from DIAL well; Layer: top of formation V; depth 3.42 to 3.47 m.	6890 ± 300 (4940 BC)
	PRL-649. Lake sediment lake mud from DIAL well; Layer: top of Formation VII; depth 4.17, 4.15 to 4.18 m.	9380 ± 220 (4940 BC)

UTTAR PRADESH

18.	Kauvakhoh, District Mirzapur PRL-907. Microlithic deposit soil from Layer I; depth 0.4 m. Sample No. I.	1070 ±130 (AD 880)
19.	Son at Chopan, District Mirzapur PRL-908. Shells (Holocene deposit (?) shells from Layer II; depth 5 m. Sample No. II	 31000
20.	Thapli, District Tehri PRL-731. PGW deposit charcoal; Locus: Trench TPL-1, Layer 1,2, 3; depth 0.1 to 1 m. Sample No. TPL-1/80.	 2090 ± 140 (140 BC)

WEST BENGAL

21.	Bahiri, District Birbhum PRL-886. Chalcolithic deposit (?) charcoal; Trench BHR II, Layer 5; depth 2.10 m Sample no. 1. Z.	 2850 ±150 (900 BC)

PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS[1]

The present report incorporates the work done on the subject at the Birbal Sahni Institute of Palaeobotany, Lucknow. Quite a few samples of charcoal, charred grains and pollens were analysed and the results incorporated in this report.

ANDHRA PRADESH

1. Rampuram, District Kurnool.— Charcoals studied and identified together with their radiocarbon dates are given below

a) BS-383, *Hardwickia binata* (sample No. RMP/82-IV, YEH-Qd, No. II, layer 2, depth 8-15 cms, 3880 ± 110 years BP).

b) BS-384, *Gmelina arborea* (sample no. RMP/82 III Tr-E4 Qd. IV, layer (3) depth 35 cms 645 ±100 years BP).

2. Veerapuram, District Kurnool.— Charcoals in samples BS-254 (s-525, VRP-2, depth 1.11 m, 2030 ± 130 years BP) were identified as of *Acacia* sp.

BIHAR

3. Rajgir, District Patna.— Charcoals in sample TF-46 from the Iron Age horizon were identified as of *Madhuca latifolia.*

GUJARAT

4. Nagara, District Kaira.— Charcoals in sample TF-363 from the black-and-red ware culture were studied and identified as of *Adina cordifolia.*

5. Surkotada, District Kutch.— Three of the several charred lumps recovered from Locus XA-4, Qd 1, layer 5, depth 1.6 m (period III, 1660 BC) on segregation yielded as many as 740 seeds, an overwhelming majority of which were from wild plants. Their identification is in progress.

HARYANA

6. Daulatpur, District Kurukshetra.— The cultivated strain of rice (*Oryza sativa*) were identified in the charred lumps from Trench A I, stratum 4, depth .1.02 m of the Early His torical period.

[1] Contributed by Vishnu — Mittre, K.S. Sarswat, Aruna Sharma and Chanchala.

The examination of plant remains from the lumps have brought out remains of the wild and cultivated strains of rice (*Oryza rufipogon* and *O. sativa).*

7. Singh-Bhagwantpur, District Kurukshetra - Charcoals studied and identified together with their sample nos. are given below.

a) 30-T-111, *Acacia sp.* (V-X X 1.90-2, 10, pit 4)

b) 30-S-128, *Acacia* sp. (XIII 0.55 X 2, 75-3.10 pit 3)

c) 30-R-50, Bamboo (VI 0, 30 X 1.78-2.20) Pit management (VI-DC, Pit-4)

JAMMU AND KASHMIR

8. Gufkral, District Pulwama.— Charcoal studied and identified together with their provenance are given below.

a) BS-356, *Pinus* sp. (sample No. GFK/2/81, field II, GFK-81 x D5, Qd 2 (6), depth 1.65-1.70 m period I B, early Neolithic culture, 3570 ± years BP).

b) BS-357, *Prunus* sp. and *Aesculus indica* (sample No. GFK/3/81 field III GFK-81 x D 4, Qd 1 (6) depth 1.65-1.70 m period IB, early Neolithic culture, 3470 ±110 years BP).

c) BS-358, *Pinus* sp. (Sample No. GFK/4/81, field IV, GFK-81 x D4, Qd 1 (7), depth 1.80 m period IA aceramic Neolithic, 3130 + 120 years BP).

d) BS-359, *Juglans regia* (sample No. GFK/781, field VII, GFK-81 C2, Qd 4 (6), depth 1.65 m period IB early Neolithic culture, 3980 ±120 years BP).

MADHYA PRADESH

9. Amgaon, Kunjhun, Siuhawal, Tingi, District Sidhi:— The samples from sections exposed along the right and left banks of the Son Valley at archaeological sites Kunjhun-II river section (56 samples), Kunjhun-II (16 samples) and from the sections 1 km south of the Sihawal village (68 samples) on pollen analysis were found to be without pollen grains. The 5.90-6.30 m and 6.50 m depths of the Kunjhun-II river section were dated by radiocarbon to BS-832, 3320 ± 175 and BS-377, 4200 ± 110 years BP repectively.

The dark clay band about 100 cm in thickness (190-290 cm) intercalating sand and exposed along the banks of the Chhui stream at Tiungi and dated from 6720 ± 110 to 5010± 100 years BP (BS-410, BS-409) had produced pollen evidence of a savannah dominated by sedges and grasses with moist deciduous trees of *Anogeissus, Terminalia, Emblica, Lager-stroemia* and members of Myrtaceae.

The pollen profile dating from about 2000 years BP from Amgaon swamp showed deciduous tree Savannah into which Sal (*Shorea robusta*) immigrated about 1200 years ago (BS-407,1200 ±110 years BP) and thereafter, the moist deciduous Sal forest was established.

10. Kunjhun, District Sidhi.— The superficial examination of 2500 potsherds from Kunjhun, after thorough washing in water showed the occurrence of fragmentary rice husk in

quite a few of them. These were tentatively identified as wild strains of rice.

11. Kayatha, District Ujjain.— The recent investigation of carbonished material in sample TF-402 from thissite brought out two kinds of wheat (*Triticum sphaerococcum,* and *T. compaction*) and seeds of *Dolichos biflorus.*

Charcoals from three samples were studied, and identified, the details of which are given below:

a) TF-395, *Acacia* sp. and *Cassia fistula*
b) TF-398, *Acia* sp.
c) TF-399, *Acacia* sp.

12. Besnagar, District Vidisha.— Charcoals in two samples TF-387 and TF-388 were studied and identified as of Acacia sp.

MAHARASHTRA

13. Daimabad, District Ahmednagar.— Charcoals in four samples ranging from Savalda to Jorwe cultures were studied. Their identification is given below:

a) Depth 0.30 m *Acacia* sp., *Ziziphus,* (DMD 5, Sector II, Trench D 2'3, layer 2, C 2'2 2-00 m x c 2'3 5.00 m)

b) Depth 0.36 m *Acacia* sp., *Anogeissus latifolia, Cassia fistula, Dalbergia* sp. (DMD 5, Sector II, Trench Y'3, layer (7) sample No. DMD/30/1977-78 lous Y'3 4.35 m x Y'Z 4.30 m)

c) Depth 2.10 m *Acacia* sp., *Anogeissus* sp. (DMD 5, Sector II, Trench 2'3, layer 10, sample No. DMD/39/1977-78, locus Y'3 2.70 m x 2'3 4.20)

d) Depth 10.00 m *Pterocarpus* sp., and *Trema orientalis* (DMD-5, Sector II, Trench Y'2 layer Kiln no. 1 sample no. DMD/46/1977-78 locus X'l X Y'l 4.50 m).

14. Nevasa, District Ahmednagar.— The carbonized grains from this Chalcolithic site in packet TF-39 were identified as of Oryza species (a single broken fragment), *Lathyrus sativus, Pisum arvense, P. sativum, Vigna mtingo* and nuts of *Ziziphus.*

15. Sonegaon, District Pune.— Charcoals in two samples from the Jorwe culture were studied. Charcoals in TF-378 as of *Acacia* sp. and those in TF 380 as of *Tectona grandis.*

PUNJAB

16. Rohira, District Sangrun.— The carbonised grains and seeds from the mature Harappan period (about c. 2000 BC) were identified as of hulled-barley (Hordeum vulgare L. six-rowed), naked-barley (*Hordeum vulgare* L. var. *nudum-* six-rowed), wheat (*Triticum sphaerococcum* Perc, and some other forms resembling a tetraploid species), Kulthi (*Dolichos biflorus* L.) Lentil (*Lens culinaris* L.) and fenugreek (*Trigonella foenum-graecum* L.).

UTTAR PRADESH

17. Mahagara, Belan Valley, District Allahabad.— The scan microscopy of the rice husk imprints on pot-sherds supported the identification of the wild strains of rice (*Oryza rufipogon*) reported earlier (*1981-82,* p. 106) has been found to be a *spontanea* rice, a hybrid between the wild and cultivated strains of rice.

18. Sringaverapura, District Allahabad.— The plant-remains from different cultural horizons in an archaeological trench SVP-1, YA3-Qd, 3 and dated from c. 1050-700 BC were identified as detailed below:

A. Period I (c. 1050-1000 BC): The layer 19 E yielded the grains of cultivated rice (*Oryza sativa* L.), barley (*Hordeum vulgare* L. hulled, six-rowed) and the seeds of sesame or til (*Sesamum indicum* L.). A few fibres of cotton discovered from a cavity on a pot-sherd compare those of cultivated cotton. The anatomical studies of leaf and husk fragments in the clay showed that they belong to cultivated barley and rice. Leaf-peels of Kans or Kusha (*Saccharum spontaneum*) and Munj (*Saccharum bengalense* Retz.) were also identified.

B. Period II (c. 950-700 BC): The carbonised food grains in layers 18 to 16, were identified as of barley (*Hordeum vulgare* L. hulled, six-rowed), wheat spp. (*Ttiticum sphaerococcum* Perc. and *T. compactum* Host.), cultivated rice (*Oryza sativa* L.), gram (*deer arietinum* L.) and black gram/green gram (*Vigna* sp.). The husk and leaf-remains of rice and barley, leaf-peels of palm (*Phoenix sylvestris*) and a grass-khus (*Vetiveria zizanioides*) were also identified.

19. Baraunha, District Mirzapur.- The scan microscopy of rice husk imprints on pot-sherds from this Neolithic site have confirmed the identification of wild perennial rice *Oryza rufipogon.* Besides, rice husks of the cultivated strain *O.sativa* were also identified.

20. Lekhania, District Mirzapur.- Charcoals in two samples from burial in rock shelter were studied and identified: charcoals in TF-340 as of *Anogeissus pendula* and *Lagerstoemia flos-reginae,* and those in TF-341 as of *Callicarpa lanata.*

21. Manigara, Adva Valley, District Mirzapur,- The scan microscopy of fragmentary rice husk imprints has confirmed the remains of wild and cultivated strains of rice (*Oryza rufi pogon,* O. sativa) in pot-sherds as reported earlier (*1981-82* p. 106).

22. Hulas, District Saharanpur.— The carbonized food grains from this Late Harappan site were identified as of *Hordeum vulgare, Triticum sphaerococcum, T. compactum, Dolichos biflorus, Pisum arvense, P. sativum, Lathyrus sativus, Vigna radiatus* and *V. mungo.* A single subglobose seed with vaguely rugose ornamentation pattern was provisionally referred to that of Ragi (*Eleusine coracana*). A lenticular-circular seed with shining seed surface showed characters similar to seeds of Chenopodium. The remains of rice of both wild and cultivated strains

(*Oryza rufipogon* and *O. sativa*) were found as imprints on potsherds from this site.

23. Un, District Saharanpur.— Further investigation of imprints of rice husk on a single potsherd from this Late Harappan site and briefly reported earlier (*1979-80,* p. 114) showed that these husk impressions compare with those of the wild annual rice *Oryza niura.*

WEST BENGAL

24. Mahisdal, District Birbhum. The remains of wild and cultivated (*Oriyza rufipogon, O. sativa*) strains of rice were identified in the carbonised grains in sample TF-390.

MUSEUMS

1. Taj Museum, Agra.— The Taj Museum, organized in the West Naqqar Khana of the Taj Mahal complex, was thrown open to the public.

2. Government Museum, Almora.— The museum was shifted to its new building situated on the Mall Road opposite the bus station. Four galleries of art and archaeology with one exclusively devoted to the personal collection of eminent Hindi poet Sumitranandan Pant were also set up during the period under review. The museum acquired eighty-three terracottas, three wood carvings, two pieces of textiles, two manuscripts, one sword, a few miscellaneous objects and fifty-six coins. The most remarkable acquisition was an exquisitely carved standing image of Surya (pl. 93) dateable to eighth century AD.

3. Archaeological Museum, Amaravati.- The museum acquired for its collection a late Medieval iron sword with hilt, one iron spear and six lime stone slabs bearing Medieval Telugu inscriptions (pl. 94, 95).

4. Archaeological Museum, Badami.- New acquisitions in the museum included eleven sculptures and an inscribed victory stone pillar. Of the sculptures, images of Mahishapurmardini, Tirthankara, *Gana,* female torso and a miniature elephant deserve mention.

5. State Museum, Baroda.- Out of eighty-three objects of art, there were sixty-one stone sculptures, four wood-carvings and eighteen oil-paintings respectively.

6. District Museum, Betul.- With a view to enrich the collections of the museum, late Paramara stone sculptures and fossils were collected from different sites located in Narmada valley.

7. Open Air Museum, Bhopal.- The Department of Archaeology has laid a plinth of Open Air Museum for displaying the sculptures, paintings, rock shelters, etc., in front of State Museum, Bhopal.

8. District Museum, Bilaspur.- The museum shifted its. collection of sculptures to a new building chosen for museum.

9. Prince of Wales Museum, Bombay.— The museum in collaboration with the Heras Institute, Bombay, organized an exhibition entitled "Visions of Ganesa" to coincide with the Ganesa festival. It was held in the key Gallery of the Museum which included hundred and twenty images in stone, metal, glass, porcelain and ivory; besides paintings on cloth and miniature paintings, ranging in date from the fifth to the contemporary times. While exhibiting the traditional images the main emphasis was to focus Ganesa's association with Sapta-matrikas, dancing Ganesa with Nataraja, Ganesa as one of the deities in the *panchayatana* and numerous other aspects which was on view from 22nd August to 12th September. An, illustra ted booklet was also published on this occasion.

One more exhibition consisting of Pahari and Rajasthani miniature paintings, stone sculptures, terracottas, wooden, ivory, stucco and metals objects, collected by Karl & Meherbai Khandalavala between 1937 and 1950 was organized in the Coomaraswamy Hall of the museum. Besides, a few Nepali bronzes were also on display.

The museum also acquired through the Crime Branch thirty-six stone sculptures, twenty-eight bronzes, three terracottas, woollen shawls and miniature paintings for its collection. During the period under review, the museum arranged the Coomaraswamy memorial lectures, which were delivered by Kapila Vatsayayan on "Text and context in Indian miniature painting" at the museum premises.

10. Indian Museum, Calcutta.— The archaeological collection of the Indian Museum was enriched further by acquiring objects through purchase, gift and field survey. Notable additions included seven sets of copper plate inscriptions of different periods and copper celt of the proto-historic times. The copper celt unearthed at village Perna, District Midnapur, West Bengal acquired by purchase, is one of the largest celts so far found in Bengal. The copper plate inscriptions included a single plate with both sides inscribed containing thirty-seven lines; the grant, found from Panchrol village within Egra Police Station in District Midnapur belonging to the reign of Sasanka, the king of Gauda recording a gift of land by Sriman Nandavarman of the Ganga dynasty, belonging to the seventh century AD while another set of three copper plates bears a seal issued by Silabhanjadeva of Kalinga. The other plates hail from Orissa and may be ascribed to the Medieval period.

Of the sculptures, bronze images of Lokesvara and Buddha, dateable to the Pala period, three brass idols of Mahishamardini, two-armed Devi mounted on a ram and a female deity belonging to the late Medieval period are noteworthy.

The coin cabinet of the museum was enriched by the addition of ninety-nine pieces of gold, silver and copper coins. Particular mention may be made of gold coin of Kumaragupta II and four pieces of the ninth Asiad Commemorative issues. After an exhibition, the museum received back its collections which were sent in connection with the "Festival of India" to London.

11. Bhuri Singh Museum, Chamba.— The museum acquired the following objects during the year; fifteen paintings and drawings, one leaf of illustrated manuscript and four textiles.

12. Chandradhari Museum, Darbhanga.- A thousand manuscripts on Basahapaper in Mithilakshara were collected from Saharsa for the museum collection. Manuscripts and Rag-ragini paintings were chemically treated.

13. Indian War Memorial Museum, Red Fort, Delhi.- The museum in the Naubat-Khana of the Red Fort was thrown open to the public after thorough re-organization. The photographs connected with Netaji's life were displayed in the Netaji Gallery.

14. National Museum, Delhi.— During the period under review, the museum acquired forty-one bronzes, twenty stone sculptures and eighty-seven terracottas. Of the new acquisitions the following bronzes deserve special mention; Tripurantaka, Early chola, Tamil Nadu; Sambara, thirteenth century, Orissa; Vishnu, late Chalukyan, Karnataka; Vasudeva Kamalaja, fifteenth century, Tibet. The noteworthy stone sculptures are: three Chandella sculptures, dated to tenth century from Khajuraho, representing Yoga Narayana, the celestial couple and worship of Sivalinga; a buff sandstone image of Chamunda dated to eleventh century, one small stone sculpture depicting the scene of Mara's attack assignable to ninth-tenth century from Kashmir and one fragmentary ring stone belonging to the Maurya-Sunga period.

15. Archaeological Museum, Halebid.— The museum extended open-air sculpture gallery upto the adjoining lawn where eight selected architectural stone pieces depicting various types of *Sikharas* were displayed. Besides, a bronze image of Bhudevi, a set of copper plates, small sculptural fragments and a few coins were also exhibited in the museum gallery.

16. Archaeological Museum, Hampi.— New acquisitions in the museum comprise a fragmentary stone mould of a four-armed seated Ganesa on pedestal and two stone heads.

17. District Museum, Hoshangabad.- A few sculptures were added in the Municipal Building.

18. Periodical Museum, Rajvada, Indore.- A number of painted panels hitherto concealed in the ancient palace of Rajvada, were brought to light. Most of the paintings were made on small ivory panels depicting the stories of Krishnalila and other mythological stories in Rajasthani style. Besides, underground cells bearing painted panels were also traced.

19. Archaeological Museum, Khajuraho.- The museum acquired four hundred and thirty-eight excavated antiquities from the Central Circle of the Survey.

20. State Museum, Lucknow.- During the period under review, the museum acquired ninety-nine objects including sculptures, terracottas, coins, textiles and manuscripts.

Under the education extension programme of the museum, temporary exhibitions on

gold coins and Pahari miniatures were organized in and outside the museum. Lectures of distinguished scholars on different archaeological topics were also arranged. The work of reorganization of the archaeological section in the new wing of the museum is in the progress.

21. Fort St. George Museum, Madras.— New additions in the museum included three antiquities acquired through the Customs Department, Madras. Newly designed show cases with suitable P.V.C. background and concealed lighting were introduced in gallery No. 1 for displaying the relics of the two World Wars and grape-shots of different sizes belonging to the East India Company. Three more acqua-prints of the eighteenth-ninteenth century were chemically treated and displayed in gallery No. 7. The show cases displaying the precious silver ware of seventeenth-eighteenth centuries in gallery No. 4 were provided with new background, better locking arrangements and labels. The display of mortars in gallery No. 1 was further improved. Index cards for all the antiquities were prepared. Preparation of a model to a reduced scale of Dharmaraja Ratha of Mahabalipuram for taking out a plaster mould and cast thereafter was taken up.

22. Government Museum, Madras.— The following metal objects were acquired as treasure trove items; crawling Krishna from Ugandangudi, Tiruvadanai Taluk, District Ramanathapuram; two lamps, crawling Krishna and a fragmentary lamp from Perambur, Thanjavur Taluk, District Thanjavur; fourteen fragmentary metal vessels from Vettaikkaranpudur, Pollachi Taluk, District Coimbatore; image of Vishnu and discus from Kiliyur, Papanasam Taluk, District Thanjavur; images of Siva and Devi from Manalur, Papanasam Taluk, District Thanjavur; image of Devi from Palanjanallur, Kattumannarkoil Taluk, District South Arcot; five metal objects from Madanpatlur, Pattukkottai Taluk, District Thanjavur; two metal Tiruvasi from Panayakurichi, District Tiruchirappalli; one copper Yantra bearing modern Tamil characters from Perumbedu, Ponneri Taluk District Chaingalput; and three stone sculptures from Arigathurai, Gummidippoondi, District Chinglepet. Two confiscated images of Rama-Sita and Ayyanar were also added to the collection. Two contemporary paintings were purchased on the recommendation of the Art Purchase Committee. Besides these, there were forty objects variously of porcelain, papier-machie, metal, etc., seized by the Customs, Madras, handed over to the Museum by the Southern Circle, Madras. In addition to these, South Indian *Panams* were also received. The museum sent twenty exhibits comprising bronzes, stone and metal ware to Aditi Exhibition. The birth centenary of Mahakavi Subrahmanya Bharati was also celebrated in the Museum.

23. District Museum, Mandsaur.— A small museum was set up in which the sculptures lying at Daspurkunj Yasodhar Nagar, Collect orate's Bungalow and the local colleges were collected.

24. Local Museum, Bhanpura, District Mandsaur.— With a view to organizing a separate gallery for Hinglajgarh, sculptures from the site were shifted to the museums at Bhanpura and Indore.

25. Government Museum, Mathura.— During the year two hundred and forty-eight objects were added to the museum which included seventeen sculptures, seven terracottas, three earthen vessels, eleven clay seals, two hundred and seven silver and copper coins, two bronzes and one painting. Inscribed stone pedestal (pl. 96) of a standing Buddha figure be longing to the time of Budhagupta is an outstanding piece which proves the continuity of Gupta control over Mathura even after Chandragupta II.

In continuation with the Golden Jubilee celebration of its new building, a new gallery of coins showing the chronological development of Indian Coinage from 600 BC to the present day was inaugurated. The museum also organized seminars on '*Mathura Kala Ki brahman dharma ko den*', and exhibition entitled '*Mathura ki matri deviyan*' competitions for school children and cultural programmes. Out of fifty pieces from the reserve collections of the museum, only a few noteworthy sculptures, viz. winged Mother-Goddess, Parvati, Saraswati, Indrani and Ganga were displayed in the exhibition of Mother-Goddess.

Third Growse memorial lectures were held in which S.C. Kala was invited to deliver two lectures on 'History of terracottas' and 'Mathura terracottas'. A temporary exhibition entitled 'Ancient Indian terracotta' was also arranged on that occasion. Of the hundred and twenty-eight terracottas displayed in the exhibition; mention may be made of a monkey toy with a young one in her lap (34.2390), Goddess with a garland of skull (34.2451), four-armed Goddess holding trisula (54.2435) and boar incarnation of Vishnu (58. 4729).

26. Local Museum, Dubkund, Morena.— A collection of sculptures recovered from the debris clearance at Dubkund were displayed at the original site of the temple a part of which was shifted to the collectorate, Morena.

27. Central Museum, Nagpur.— The work of providing wooden pedestals to the sculptures continued this year. A diorama showing the Megalithic stone circles with burials was prepared in the Central Hall.

28. Local Museum, Sarangpur, Rajgarh.— A local museum was opened to exhibit the antiquities collected from the surface. They comprise sculptures, (pl. 97) terracotta figurines,-punch-marked coins, gold beads, silver coins and iron objects.

29. Local Museum, Jharada Rattam.— A museum was set up to display the antiquities collected from the neighbouring sites.

30. Shri Guru Teg Bahadur Museum, Anandpur Sahib, Ropar.— A new museum was opened where twenty-four paintings of contemporary Punjabi artists are on view.

31. Archaeological Museum, Sarnath.— A fragmentary image of Hariti bearing an inscription was acquired for this museum.

32. Wooden palace of Shivappa Nayaka, Shimoga.— The setting up of the museum is in progress.

33. State Museum, Simla.— One hundred and ninety-eight objects were added to the museum through purchase, exploration and gift; they comprise: Pahari paintings and drawings, stone sculptures, costumes, Lithographs, wood-carvings, terracottas, engravings and a late Gupta brick. Of these, one manuscript on Devi Mahatmya with illustrations—is an imp- ortant collection. A spacious diorama was prepared in the museum to display extinct animals of the Plio-Pleistocene period in a natural setting with suitably painted background.

34. Tipu Sultan Museum, Srirangapatna.— Three furnitures of Tipu's time (pl. 98, 99, 100) and one hundred and eight coins (pl. 101, 102) were acquired for the museum collection.

35. District Museum, Tiruchirappalli.— A new museum was set up in the district.

36. Multipurpose Museum, Tripura.— New additions in this museum included twenty-two Muslim coins and a leaf fossil.

37. Bharat Kala Bhavan, Varanasi.— Five hundred and seventy-two objects consisting of stone sculptures, ivories, terracottas, wooden sculptures, gold, silver and copper coins, textiles, postage stamps, paintings, decorative art objects, literary materials and photographs were acquired for the museum collection. Of these, manuscripts of 1821 Vikram Samvat on Rajasvala Stotra (238.82) and Yakshini Kalpa of VS 1873, gold coin of Wajid Ali Shah (164, 82), gold coins of Huvishka (202.82), Chandragupta II (1.83), Narasimhagupta (5.83, 273.83), Skandagupta (274.83), silver coins of Assam, Akbar, Jahangir, Bengal sultans, Bundi State, Kuninda and East India Company, Textiles Jamdani, Jardoji, Maslin and Brocades, etc. were noteworthy additions during the period under review.

38. Archaeological Museum, Velha Goa.— Out of ten antiquities acquired for this museum, painting of crucifixion of Jesus, ivory, wooden and stone statues of saints and Jesus were important.

A model of a sixteenth century Portuguese boat along with two huge original anchors is on view in a newly built gallery.



76. Burhanpur silver coins.



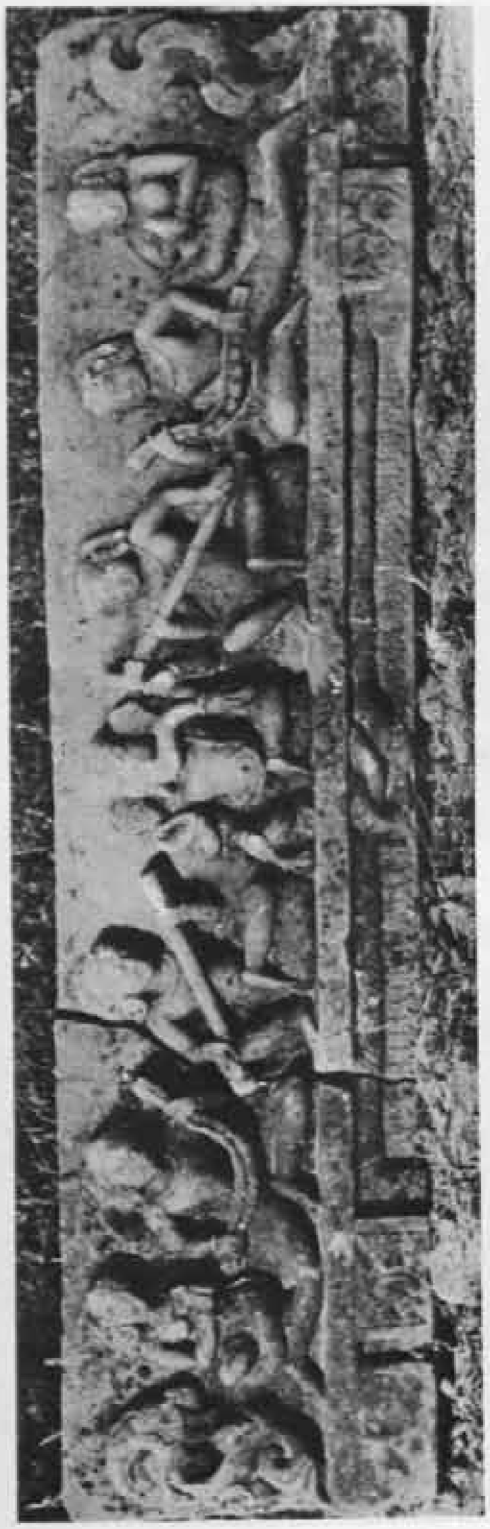
77. Surajwali Mashid iron medallion.



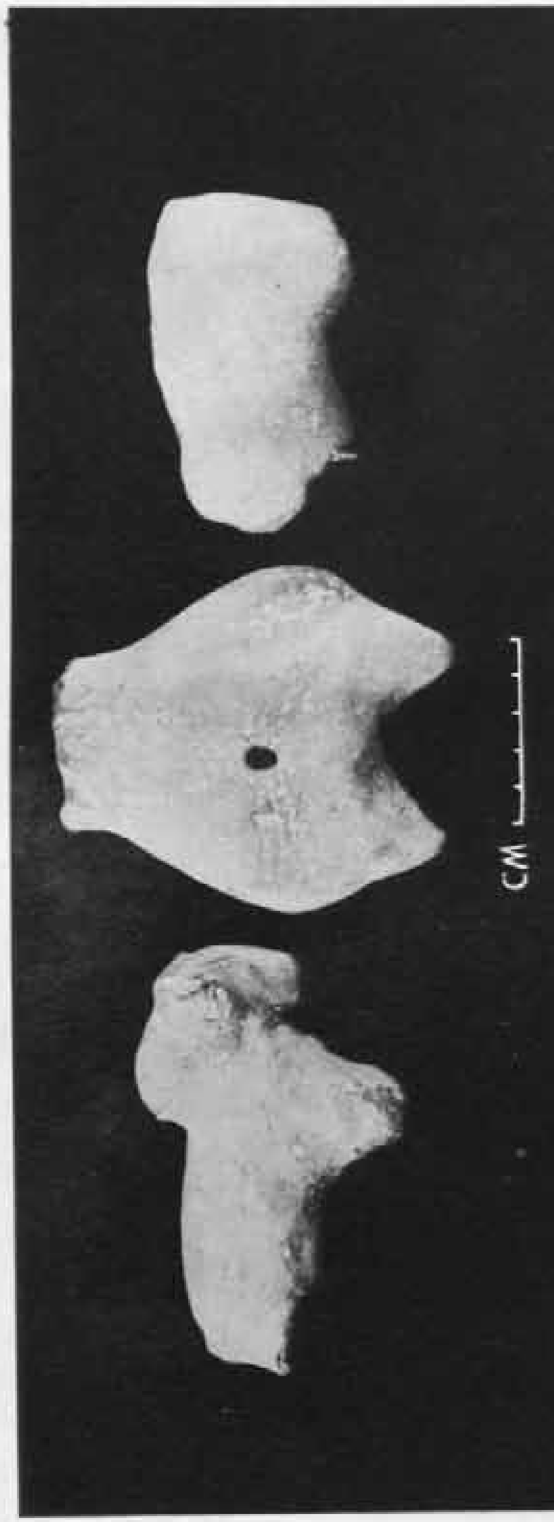
78. Kumbaria images of Siva and Uma–Mahesvara.



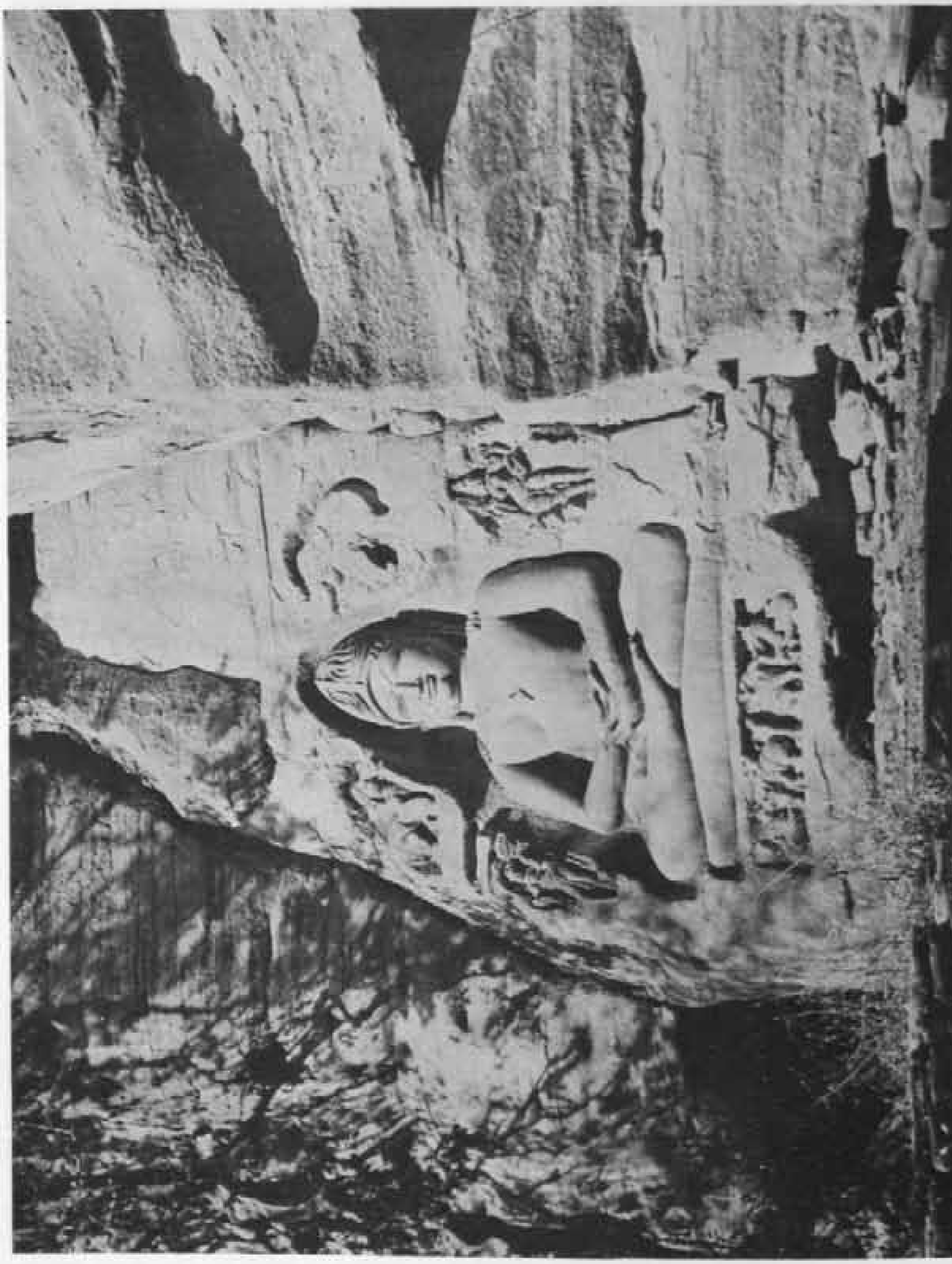
79 Kumbaria images of Siva and Uma–Mahesvara.



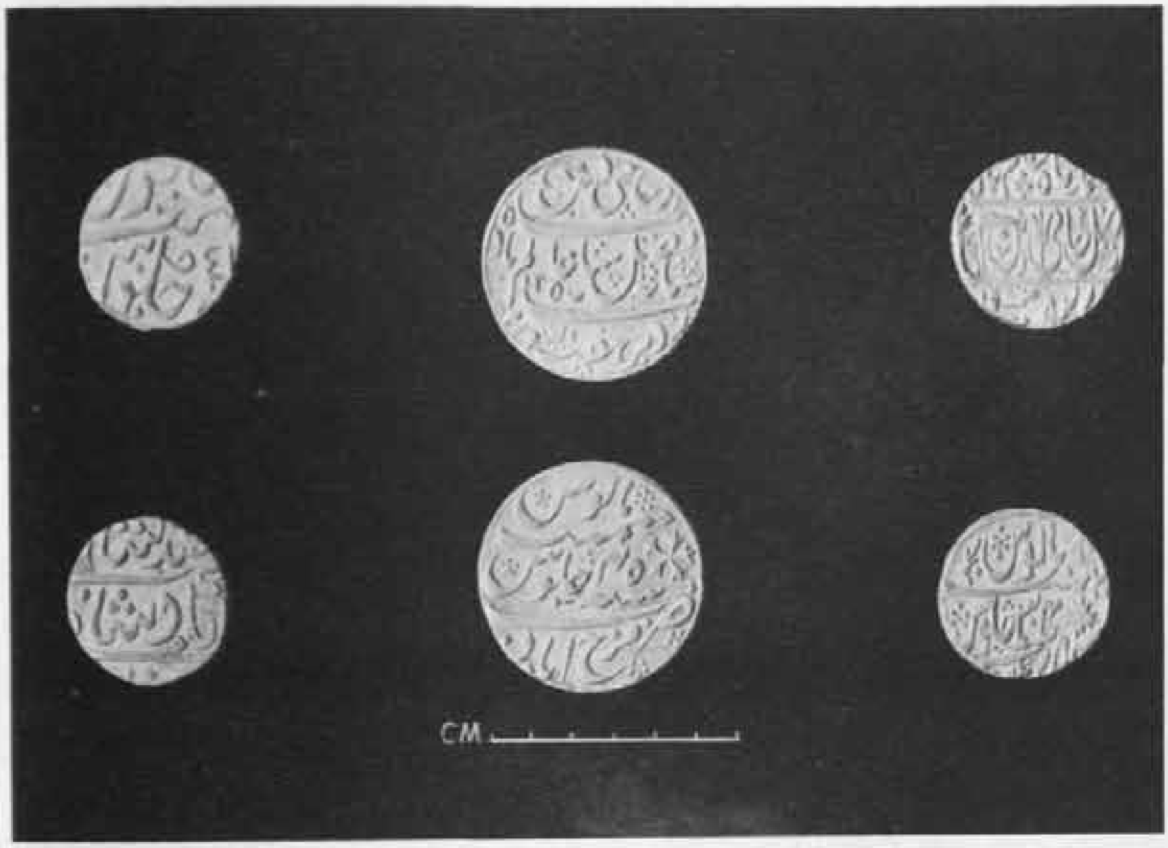
80. Amah panel showing flying Gandharvas with Ganesa.



81. Chobara Dhira terracotta figurines.



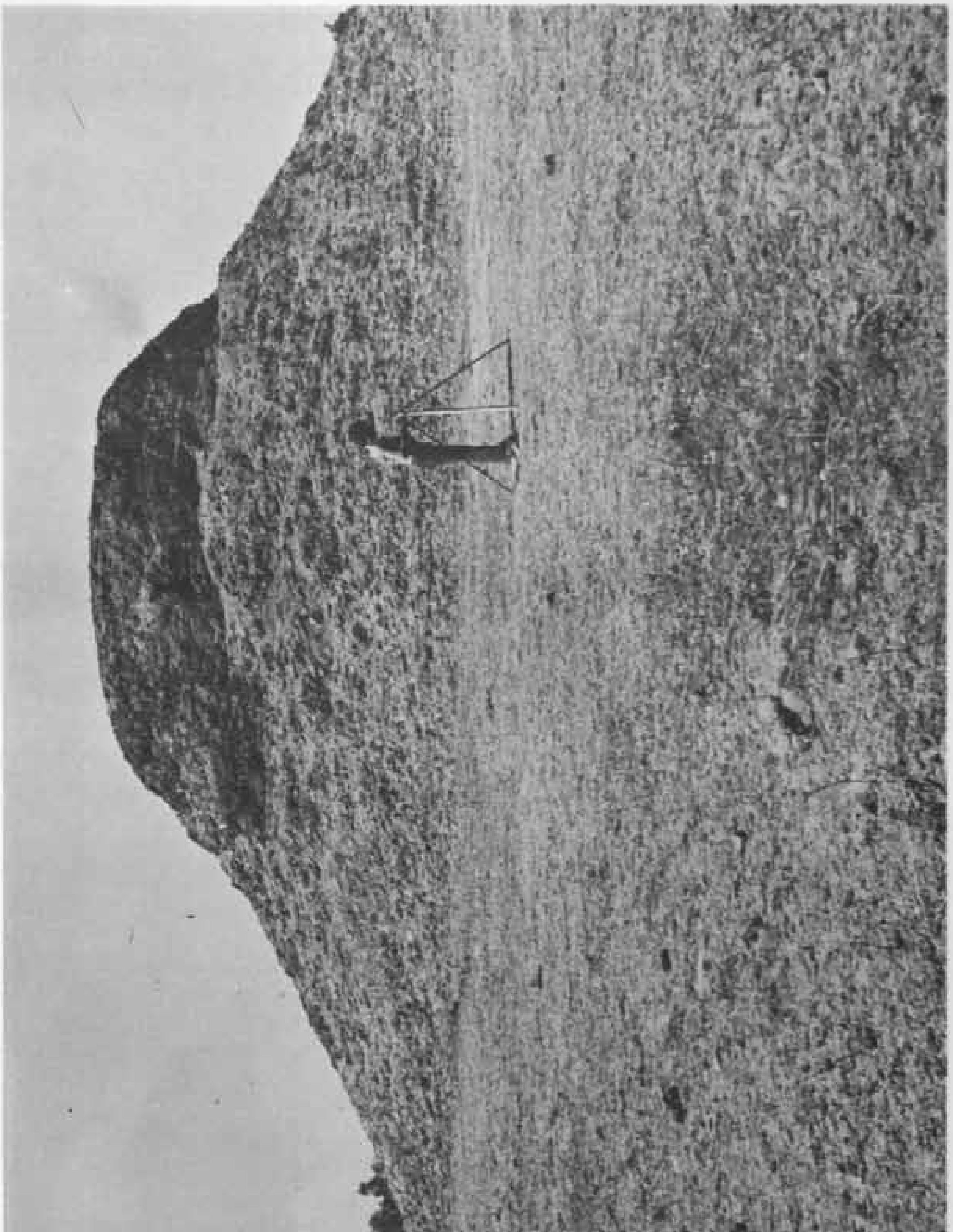
82. Gaderna Adinath.



83. Bhilheri silver coins.



84. Vigharkotra inscription of Narvarman.



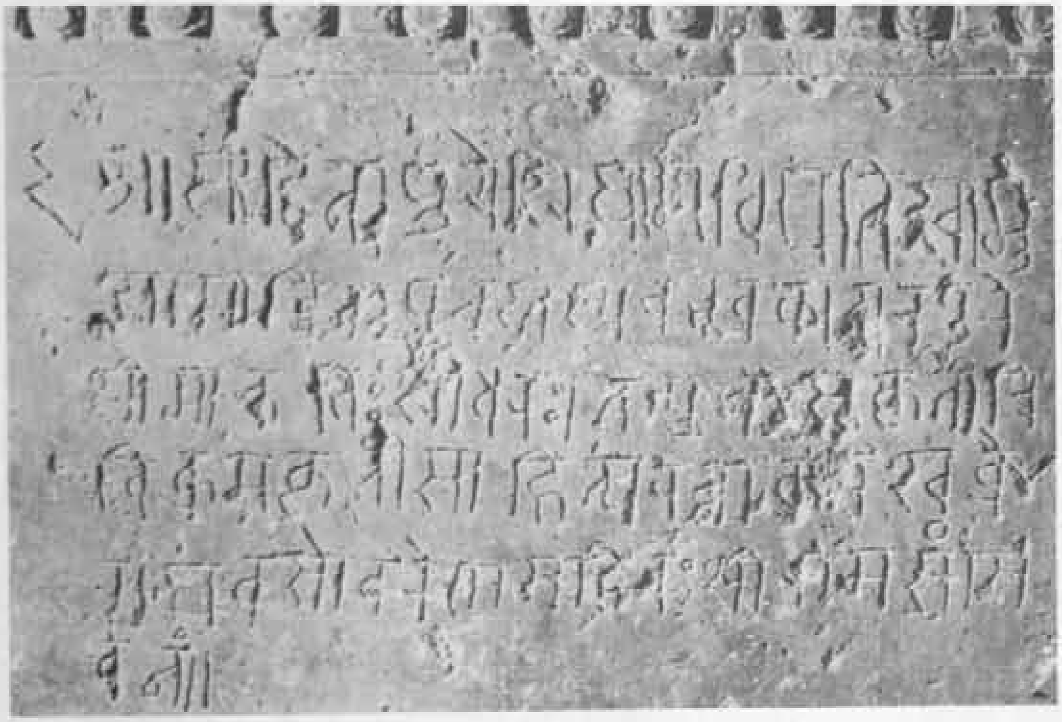
85. Madighat remains of stupa.



86. Madighat inscription.



87. Jungalihata Lakshmi-Narayana.



88. Ramtek pillar inscriptions.



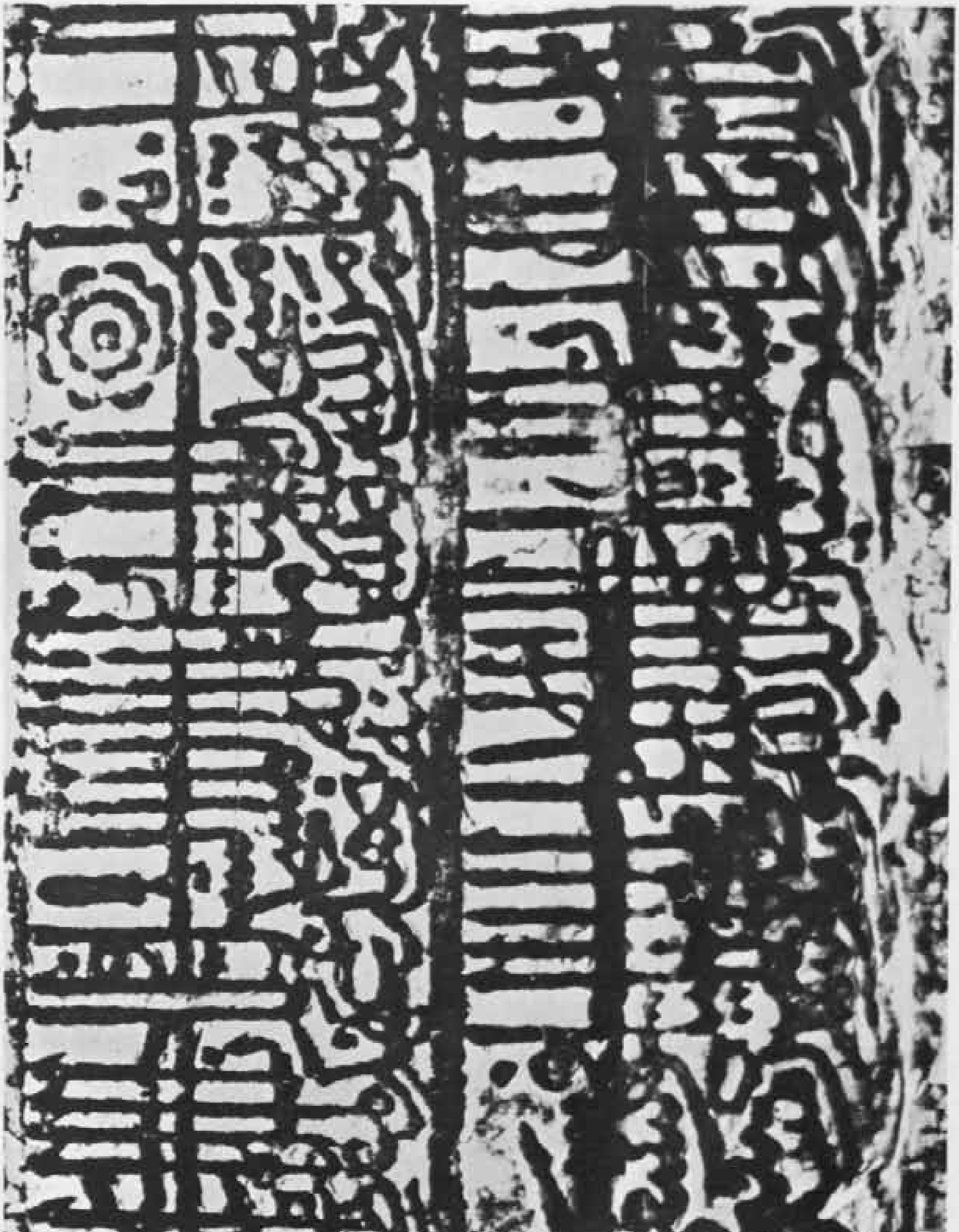
89. Ramtek pillar inscriptions.



90. Melathamangalam general view of the temple.



91. Melsathamangalam standing vishnu.



92. Gorakhpur inscription on the doorway of Imambara.



93. Almora image of Surya.



94. Amaravati inscribed stone slabs.



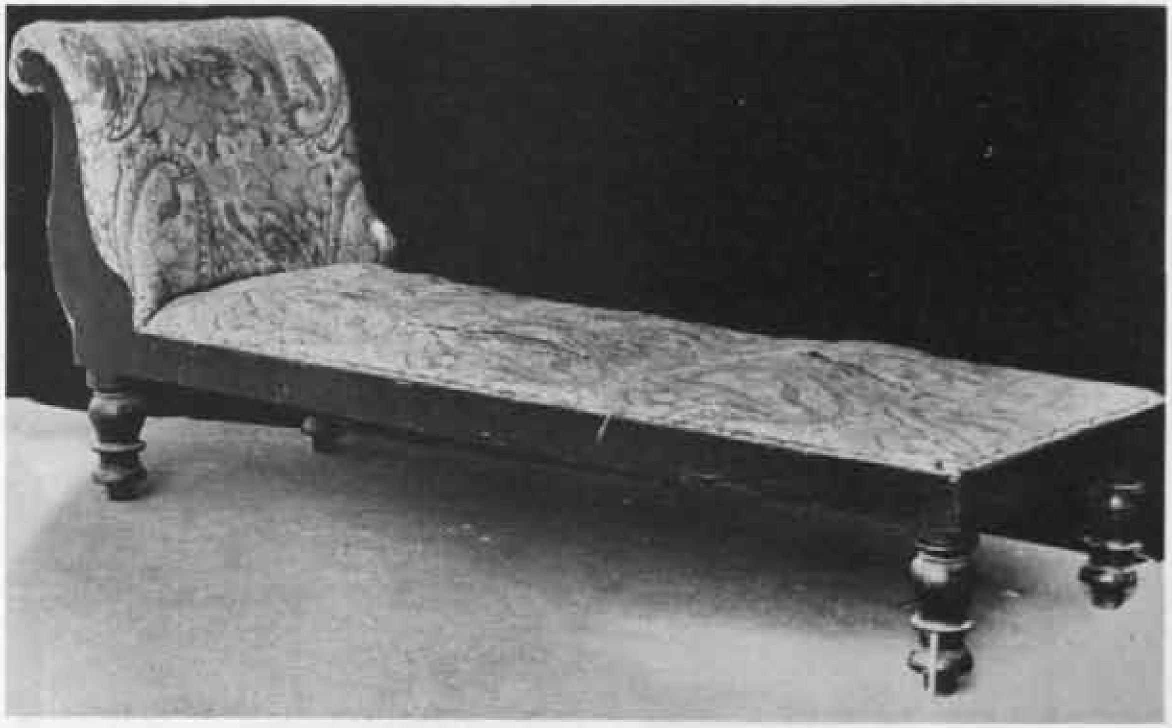
95. Amaravati inscribed stone slabs.



96. Mathura inscribed stone pedestal.



97. Sarangpur bust of Vishnu.



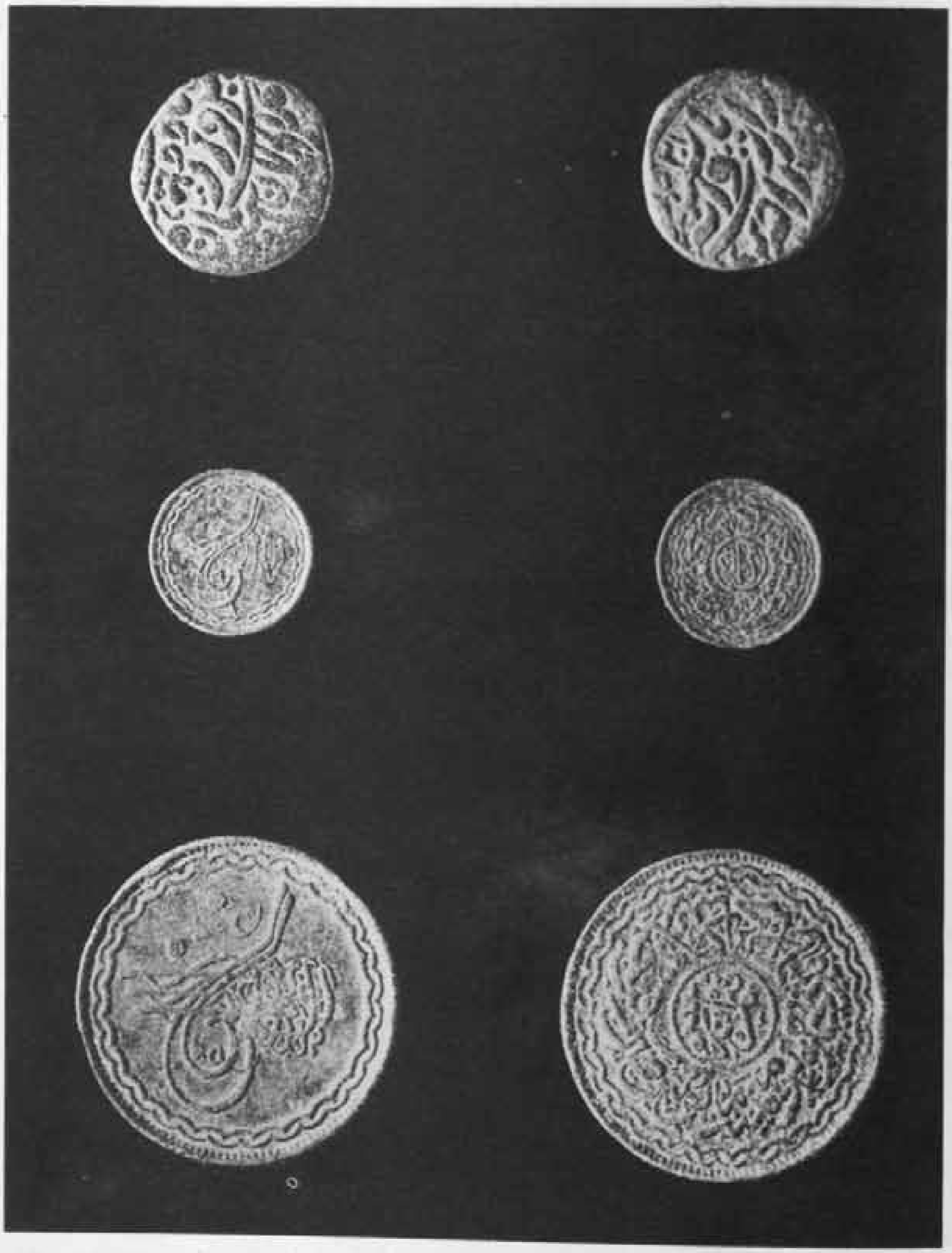
98. Srirangapatna furnitures used by Tipu Sultan.



99. Srirangapatna furnitures used by Tipu Sultan.



100. Srirangapatna furnitures used by Tipu Sultan.



101. Srirangapatna copper coins.

ARCHITECTURAL SURVEY

Temple Survey, Northern Region.— The temple Survey Project, Northern Region, under R.D. Trivedi took up the survey of the temples of the Pratiharas in Central India—as a result the temples at Nachna Kuthara in District Panna of Madhya Pradesh, Mahoba in District Hamirpur of Uttar Pradesh, and Bhubaneswar in District Puri of Orissa were taken up for study. The architectural members and sculptures of the Chaturmukha Mahadeo temple (pl. 103) at Nachna Kuthara in Panna, appear to suggest at least two different periods assignable to the late Gupta and the early Medieval times. The temple facing east, consists of a *garbha-griha* and an *antarala* rests on a plain *jagati.* The *adhishthana* is marked by narrow pilastered-niches. The *karnas* are surmounted by elongated *udgamas* (pediments) and the *bhadras* support the framed windows. The bhadras (central offsets) on the *jangha* portion are formed of two registers, the lower one is decorated by a framed-window, while the upper one by two pilas-tered niches, representing *vidyadhara* couples. The framed-window on a plain lintel bears three *sakhas.* Two inner ones are carved with *patra-lata,* issuing from either *apurna-kumbha, sankha* or the navel of a seated dwarfish *gana,* resembling in style the Parvati temple which is dateable to the Gupta period. The lower part of the window comprised a row of niches, which displays the figures of dwarfish *ganas* on the northern and southern sides. The *karna-niches* under *khura-chhadva* and elongated *udgamas* exhibit the images of *ashtadikpalas* facing their respective directions, of which Agni and Kubera on the south-eastern and north-eastern *karnas* respectively are found intact. The *varandika* consists of a *kapotika,* a pattika and a projected *parna-bandha* with cross-brackets on the *karnas* surmounted by a *chhadya* surrounding the temple. *Sikhara* consisting of a *madhya-lata* (central shoot) is flanked by *bala-panjaras,* intricately carved with chaitya-mesh design and *karnas* marked with five compressed *bhumi-amalakas.* In the entrance of the temple, pillars of an earlier period, like the door jambs are found carved with *patra-lata* issuing from navels of seated dwarfs, reminiscent of the Gupta tradition. Inside the *garbha-griha* there is a magnificent chaturmukha Sivalinga with its four faces representing *Tatpurusha, Aghora, Sadyojata* and *Vamadeva* forms of Siva facing the four cardinal directions. On stylistic pattern the temple can be dated to the third quarter of the ninth century AD.

The Sun temple (pl. 104) on the bank of the tank called Rahelia Sagar at Mahoba, District Hamirpur, is an important landmark in the later Chandella temple architecture which represents the phase of temple building activity that followed the temples of Khajuraho. In this Sun temple, the exuberant figural ornamentation of the Khajuraho temples is absent but instead, the *pitha, adhisthana,* registers of *the jangha* and *sikhara* are embellished with simple

stylised motifs occurring almost frequently. The three registers of *jangha* and two *bandhas* (bands) separating them are decorated with *ratna* (jewel) pattern which gives a monotonous appearance.

The temples at Bhubaneswar were studied with special reference to the early Medieval group of temples such as Parasuramesvara, Satrughnesvara, Mohini, Vaital Deul, Markandesvara and Muktesvara, etc. In the temples described above striking resemblance is noticed in respect of decorative motifs and architectural features which would suggest that in the initial stage of temple building activity there was a close correspondence between the temple architecture of Orissa with that of Central India.

Building Survey.— The Building Survey Project of the Survey undertook extensive survey of secular buildings of various nature for reporting and documenting under the direction of W.H. Siddiqui assisted by Dharam Pal, M.M. Srivastava, C.P. Satsangi and J.B. Chand. A good number of secular and domestic buildings in Delhi, Gujarat, Rajasthan and Uttar Pradesh were studied.

DELHI

About one hundred secular buildings including Mughal *havelis* were inspected in the walled city of Shahjahanabad, Delhi and in its neighbourhood. The earliest example of a fourteenth century house was of Muhammad Bin Tughluq (1325-135IAD)discovered amidst the ruins of *JahanPanah* at Sarai Shahji in South Delhi. In the old locality of Rudgaran near Lal Kuan whose main entrance has since been demolished, an old house of *lakhauri* bricks veneered by dressed red sandstone slabs called Lal-patthar-ka-Makan was also noticed. It had a conventional plan of a Mughal house with a porch (*deohri*) opening in a courtyard surrounded by verandahas and large halls called *Diwan-Khanas.* This building can be assigned to the eighteenth century AD. Its eastern gallery on the first floor built of red sandstone supported by Shahjahani pillars and cusped arches filled with fine lattice work with *guldasta* designs is still intact.

Another Mughal house was noticed in the Muhalla Kucha Ghasi Ram near Fatehpuri Mosque. This was once the house of Munshi Bhawani Shankar and due to historiclal reasons, it was nicknamed as Namak-Haram-ki-Haveli. It is also called Phool Mandi or Chhatta of Bhawani Shankar. Munshi Bhawani Shankar was a Khatri who rose to eminence during the occupation of Delhi by the Marathas. Later, he conspired with the English against his employers and was dismissed. This imposing old *haveli* of brick is a double storeyed building and has undergone subsequent alterations and additions. It still retains some characteristics of Medieval architecture having arched entrance with an ornamental wooden door. Another notable feature is the parapet balcony with a small pavilion of stone adorned with fine inlay work on the upper storey overlooking the main road. The Mughal builders used to call this corner pavilion on the top of the building as *nashiman* (nest of the bird).

The house of Sir Sayyid Ahmad is situated in Tiraha Bairam Khan on the road named

after him. The main entrance is now deprived of its roof. The *haveli* is divided into male and female apartments on the Mughal pattern. It comprised of a *deorhi, sahun* (courtyard), verandah and living rooms. The *lakhauri* brick masonry with ornamental plaster work represented the late Mughal architecture. Some new additions were made in recent years, but the original character of the building is still intact. Another double storeyed rectangular Mughal *haveli* was noticed in Kinari Bazar, earlier known as Gurdariyon Wali Dharmshala. It belongs to Rai Bahadur Sir Sultan Singh whose grandfather was one of the courtiers of the later Mughal emperors. The building constructed out of *lakhauri* bricks and stone was plastered with lime mortar. It has a single doorway having fine carvings and is approachable by a flight of stone steps. The projected facade is supported by stone brackets with floral designs. The flat roof is enclosed with balustrade providing a spacious terrace for use in summer season. The multifoil arched entrance gateway decorated with floral and geometrical designs is large and impressive. On both the sides of the main gateway there are niches with space to accommodate the sentries standing for the security of the *haveli.* The main gateway leads towards the spacious courtyard which is rectangular. Once there used to be a false ceiling in the *Diwan-Khana,* as is evident from the extant portions of some old wooden rafters and beams. The arcade of the *Diwan-Khana* is supported on typical Shahjahani pillars, sharply cut in ten foils and decorated with flower petals. The projected balcony is surrounded by three sides of the *haveli.* The hall is supported on pillars of red sandstone. It is profusely ornamented with floral designs and the balustrades are ornamented with lattice work. The balcony has a Bangala roof, which is profusely ornamented with floral designs.

GUJARAT

Nearly fifty secular buildings were inspected in different parts of Gujarat. Notable amongst them are pleasure palaces and pavilions of Sultan Mahmud Shah Begada (AD 1458-1511) at Sarkhej near Ahmedabad. The sluices at Sarkhej and Dholka in district Ahmedabad were found to be of sufficient engineering interest and require detailed study. The so-called Azam Khan's palace standing near Bhadra Gate at Ahmedabad, noticed earlier by James Burgess was found to be the Caravan Sarai built by Azam Khan, the famous Mughal governor of Gujarat in AH 1047 (AD 1637-38), as is evident from a verified Persian inscription in relief in *Nastaliq* characters in the interior of the arched entrance. It is an imposing monument of utilitarian purpose, built in Indo-Persian style. Its impressive entrance on the east side leads into an elegant octagonal hall, in the upper part of which is a projecting gallery faced in front by a low balcony of carved stones. Each section of the gallery is roofed by a cupola. The open court (*sahn*) which measures 47.5 m x 44.5 m is surrounded on three sides by double storeyed rooms, meant for the use of travellers.

Many *havelis* and houses were also inspected. The old localities of Ahmedabad were found to be of great architectural interest. Some of them were double or triple storeyed structures, having notable combination of wooden and brick constructions besides delicate carvings, ornamented brackets and balconies with fine wooden and stone screens. A few of them were

found to have mural paintings with floral motifs and figures. These houses are occupied by the owners or their tenants who generally did not allow to take measurement and photographs from the interiors. However, as far as possible, the outer facade and ornamentation on the entrance and balconies have been properly documented.

Among the most striking examples of wooden architecture of the Gujarati *havelis* is that of Gautam Sarabhai (pl. 105) which has survived at Hasol, a village situated about 16 km away from Ahmedabad on the River Sabarmati. This *haveli* is built on a square plan with open porch and four rooms of square pattern. The porch is attached with a gallery. It has a verandah with stone pillars of circular fluted designs comparable to rock-cut pillars of Western India. It is an imposing brick structure, consisting of beautiful wooden frames, pillars, capitals, struts, brackets, beams and balconies, profusely carved with geometric and figurative motifs. The river side has a circular bastion type of construction with ornamental wooden balconies and *chhajas,* etc. There is a gallery supported on delicately carved fluted pillars. The wooden frames of doors and window are finely carved and were originally painted in yellow, red and other colours. The thick wooden pillars are supported by the stone-bases of traditional Gujarat style. There are fine wooden lattice work on the balcony which is supported by elephant head brackets. The original architectural members are the carved door-jambs, template struts or brackets of the beams. The ceiling is supported on an ancient central circular wooden pillar whose rafters radiate like sun beams. The wooden windows have beautiful *jali* work. The ornamental wooden hanger suspended through the ceiling are also very artistic pieces. The staircase has also wooden carving and a female figure is fixed on its top. Most of the work is done in teak wood. The wooden-doors of an almirah (pl. 106) in the wall of the room is an excellent example of artistic tradition of Gujarat.

A late eighteenth century double storeyed building, popularly called Bhadra at Baroda is now occupied by the Mamalatdar court (*Kacheri*) and the other offices of the state government. The building is erected on a raised stone platform with post and lintel arrangement. The facade is notable for an ornate projecting balcony (pl. 107). There are series of arch windows now covered with wooden screens. The architrave of the windows are in stone but designed with graceful arches. The most artistic aspect of this building is the projected balcony in stone, profusely decorated in the form of a lotus in full bloom over which a pillared canopy with an octagonal drum and raised dome is provided.

Another notable secular building at Baroda is the Nazar Bagh Palace (pl. 108) which is reported to have been the residence of the earliest Gaekwad ruler of the state. It is a four storeyed imposing mansion constructed over a raised plinth with subterranean chambers. It has marked European influence in its structural design as well as in its ornamentation scheme. The eastern side has a pillared porch while other sides are provided with wooden staircases of European design. The entire building is in delicate plaster with panels of relief stucco ornamentation embellished in gold. The plaster cornices are decorated with wreath motif. False wooden ceilings were also beautifully painted in different colours. The arched coffers are decorated in coloured glasses with paintings similar to the Christian churches of Goa and Daman. Originally placed in an enclosed garden, it is now in desolate condition.

There used to be metallic lanterns of European fashion. One of them still stands with its stone pedestal and iron sculpture of mythical horses which are very striking. It is now occupied by the Income Tax Offices although its condition is bad.

RAJASTHAN

A large number of secular buildings mostly comprising of old *havelis* were inspected at different places in Rajasthan. Some of them were found to be of archaeological and architectural interest which are briefly noted here.

The most interesting secular building was discovered at Bari, the favourite Mughal hunting site in Dholpur District, Rajasthan. It is a building, erected on a rectangular plan on the bund of a huge lake called Talab-i-Shahi. Built in *lakhauri* bricks, it is veneered by finely dressed red sandstone slabs. The open porch of Mughal variety leads to the Char Bagh garden with four delightful stone compartments with water channels and a central tank with fountain. The main building is erected over a raised platform with multifoil arched openings supported on tall Mughal pillars of Shahajahani variety. The spacious hall is flanked by living rooms and octagonal engraved towers, crowned by cupolas having elongated neck of Central Asian type, comparable to the dome of the Subz Burj of Delhi. The domes of the cupolas were originally embellished with coloured tiles whose remnants can still be seen. The historic building has been conclusively identified with Lai Mahal. Muhammad Salih Kambuh, the author of *Shahjahanama* records that this *Nashiman* (palace) was named Lal Mahal by the emperor because of its red sandstone facing. The palace overlooks the water and presents the most enchanting view of the entire area of the lake which has a platform in the centre, connected by a long causeway.

The three storeyed *haveli* of Dauji giving name to the locality in Bharatpur is owned by Udai Bhan Singh. It is built on rectangular plan in stones and lime mortar at ground level while upper storeys are constructed of *lakhauri* bricks. Approached through a small entrance, its spacious courtyard has on both the sides the *Diwan-Khanas* of three arched openings. The halls and side rooms were used for holding courts or meetings by the Jamadars. On the western side of the courtyard is a double storeyed gate adorned with profuse carvings and paintings. Its multifoil arched entrance with two small pavilions on both its sides is painted with Krishna-Radha theme and court and private life of kings and queens. The upper storey of this gate deserves mention. It is locally called Bengali because of its curved roof in the form of Indian palanquin. It is decorated with lattice work in different floral and geometrical designs. The screen work is quite interesting from an architectural point of view. The arrangement is in keeping with the *purdah* tradition of the great Mughals. It can be assigned to eighteenth century on the architectural grounds.

The Banb-ki-Haveli at Bharatpur is situated near the Kotwali and is presently used as a school named Aggarwal Maha Sabha School. Built in *lakhauri* bricks, it is faced with sandstone slabs. Its three storeyed imposing entrance gate opens into a rectangular courtyard, surrounded by arched verandah. It is daieable to early nineteenth century.

Another notable *haveli* is situated on Bharatpur-Agra road. It is reported to have been erected by the uncle of Maharaja of Bharatpur, so it is popularly called *haveli* of Kakaji (pl. 109). It is a huge double storeyed edifice built in stones on a square platform. The northern main entrance of the *haveli* is double storeyed with its multifoil arched entrance flanked by two side canopies which contain stylised paintings of late nineteenth century. The themes of the paintings are inspired from the Mahabharata. The upper storey of the gateway is projected in the form of balcony with fine multifoil arched entrance and flanked by a projected pavilion with conical roof of Bengal style. It shares many architectural features of later Mughal tomb buildings.

There is yet another *haveli* of Mahant Ram Kishan located on a Kacha road from Dig to Siapura village, District Bharatpur. It is about 8 kms. away from the Dig palace complex and presently known as Luxman *mandir*. It was a residence of Mahant Ram Kishan who was contemporary to the famous Jat ruler Suraj Mal (1766—73 AD.).The imposing main gate is single storeyed but internally arranged into two storeys after the late Mughal style. It contains a lofty multifoil arch flanked by small projected balconies with Bengal roofs. These balconies are supported on decorated brackets which give a very proportionate and pleasing appearance to the entrance. There is an image of Ganesh whose both sides are decorated with paintings depicting lord Krishna, Radha and Maharaj Suraj Mal riding a horse with others. The intrados of arch is also decorated with floral designs painted in different colours. The main gate opens in a courtyard which is surrounded by cells on two sides while the western portion has a door which opens into the Luxman temple.

About 100 meters away from Dig town on Kaman road, is a reservoir called Lalaji-ka-*Kund* with bathing ghats. There are eight octagonal platforms two on each corner and a struc- ture in the east. In this eastern complex, there are two small rooms for keeping clothes. In one of the cells there are marble images of Shiva and Ganesh of recent date. On top of the building there is another structure of conical roof of Bengal variety. An image of Hanuman has been enshrined in it for worship. This interesting structure of public utility is dateable to the late eighteenth or early nineteenth century. Another imposing *haveli* at Kaman, District Bharatpur is complete in all respects. It has a *Kacheri* (*Diwan-Khana*) separate rooms for ladies *(Zepna-ekhanana), Tahkhana,* bathrooms, kitchen and *stable,* etc. It is located in the Katara Mohalla of Kaman Tehsil, popularly known as Katra Bhawan. Its present owner is Sri Madan Lal (pl. 110). The lofty three storeyed main entrance of this building is magnificent and is notable for its paintings and impressive bastions. These three storeyed bastions are octagonal with *chajjas* corresponding to each roof along with alcove. The multifoil arched main gateway is flanked by balconies of Bengal roofs, supported on decorated stone brackets. The spandrels of the arched gate are decorated with floral designs. The third storey is very small consisting of an open rectangular pavilion wholly built of white marble, containing three engrailed arches very similar to the garden pavilion of the great Mughals. Local tradition is that the material was brought from Delhi by the Jat ruler Jawahar Singh.

UTTAR PRADESH

Several secular buildings were noticed at different places. The Lala-ki-Haveli (pl. 111), situated at Nagar Village, Fatehpur Sikri (Char Hissa) District Agra, is a four storeyed lofty building of sufficient architectural interest. Its facade is remarkable for its porch with ornamental cusped arches profusely covered with stone carvings of floral pattern. The first floor has fine lattice work of exceedingly delicate variety. The second floor has the Bengal type of wall, projecting *chhajjas,* and the central wall with curvilinear roof in stone, ornamented with flutes crowned with finials. The side ones have striped domes on arched balconies in stone. It seems that originally the building was raised in three storeys but at a later date one more storey was added to it and hence the balance of the facade is disturbed. The entire structure is built in dressed block of stone with lime mortar and *lakhauri* bricks above the ground floor covered with white lime plaster of Mughal variety which is now turned black. The porch is of great artistic value. It is dateable to the late eighteenth or early nineteenth century on architectural grounds. Its stone carvings and fine lattice work mark the continuation of the artistic tradition of the region.

The historic *Diwan-Khana* standing in Saudagar Mohalla of Basantpur area at Gorakh-pur has been a big complex which has now survived partly and is occupied by Shri Viqar Ahmad and his brother's family. It has a spacious courtyard and a double bay deep hall, supported on beautiful wooden pillars of Shahjahani variety with cusped arches. The terrace has a raised parapet wall with beautiful lattice work in brick. The arched windows have also ornamental screens in bricks. There are some old houses which have the *lakhauri* brick masonry on ground floor but the upper apartments are built of sunbaked *lakhauri* bricks with wooden square frames filled in with brick masonry. These old building remains are traditionally ascribed to Prince Muazzam, son of Aurangzeb, who is reported to have "come for the purpose of hunting in the forests of the neighbourhood." He is said to have built this complex for his stay at Gorakhpur. He was also the founder of the Jami Masjid whose inscription bears his name and in his honour the name of the town was changed to Muazzamabad.

The Sarai Pukhta at Gorakhpur is a huge enclosure on square plan with the main gate on the east. The beautiful gate is notable for its raised structure with rectangular engrailed towers with a spearhead battlement of the Tudor variety. Its inner arched opening is very interesting for having wooden support in the form of an ogee arch. Built in bricks measuring (38 x 13 cm), the spacious courtyard is enclosed by verandaha with cells supported on double sets of moulded brick pillars of the British variety. The cells are covered with flat ceilings but the verandah has sloping roofs. In the centre of the courtyard is a small mosque with vaulted roof and engrailed turrets on the corners of the facade with a deep central *mihrab.* The central arched entrance with medallions has *Tughra* in plaster. The *sarai* was built by one of the early collectors of Gorakhpur, Mr. Chester, in the late nineteenth century.

PRESERVATION OF MONUMENTS

Monuments of National Importance

Central Circle

MADHYA PRADESH

1. Mahadeva temple, Bastar, District Bastar.— The temple roof was made water-tight and all the openings were provided with an angle iron door shutter filled with wire mesh for the safety of the monument and to check the entry of bats.

2. Adinatha temple, Khajuraho, District Chhatarpur.— A lightning-conductor was installed for the safety of the temple.

3. Chaturbhuj temple, Khajuraho, District Chhatarpur.— A Lightning- conductor was provided to safeguard the structure.

4. Chitragupta temple, Khajuraho, District Chhatarpur.— To prevent seepage of water, the joints, fissures and cavities were rendered water-tight by combination mortar and the surface treated with toned lime mortar as per the original.

5. Lakshmana temple, Khajuraho, District Chhatarpur.— The cavities and holes on the superstructure of the *sikharas, mandapa, mahamandapa* and the sanctum of the temple were rendered watertight. The stone surface was treated by toned lime mortar with a coating of pigment matching the original.

6. Kandariya-Mahadeva temple, Khajuraho, District Chhatarpur.- In continuation of last year's work (*1981-82,* p. 115) for preventing seepage of water, the core surface of the structure was water-tightened.

7. Vishwanatha temple, Khajuraho, District Chhatarpur.- The work of water-tighten ing the *mandapa, mahamandapa* and *sikharas* is in progress.

8. Western group of temples, Khajuraho, District Chhatarpur.- The face-lifting was completed by spreading morrum on the pathways leading to the temples. Repainting of door and window shutters was also attended to.

9. Rock-cut Caves, Bagh, District Dhar.- In cave no. 2 five damaged pillars were dis-

mantled. In their place four new R.C.C. pillars were constructed, decorated with architectural designs and geometric patterns matching the original in colour, tone and texture. The work on the fifth pillar is in progress.

The consolidation of the roofs of the caves on account of seepage of water was carried out by massive drilling and grouting. The entire surface of the caves was surveyed and the ground floor plans of cave No. 4, 5, 6 and 7 were exactly transferred on top of rock over the caves and the portions of *chaityas,* cells, pillars and stupas were precisely marked thereon. The bore hole points were selected to diffuse the strongholds of seepage of water both for curtain grouting and blanket grouting. The spacing between each bore hole was determined keeping in view the affected area to be covered by the individual bore hole. The bore hole points located in the curtain grouting were about 5 meters away from the outer extremities of the caves and drilled to about 22 metres depth with 2 metres or so below the existing floor level of the caves. After providing this curtain, around the eastern and southern sides of the caves at the cliff, the bore holes, at about 5 metre centre to centre, were marked over the roof surface of the caves. These bore hole points selected for the roof consolidation were drilled to a depth of 10 to 12 metres leaving a margin of 3 metres from the ceiling of the caves to allow the cement slurry to spread and fill up all the fissures and cavities. Each of the holes bored was grouted by injecting liquid cement slurry with the help of a specially designed grouting apparatus at a pressure of 2.50 kg/cm and the hole was finally sealed by cement concrete.

The work was attempted as per the directives of an Expert Committee appointed for the conservation of these caves. The actual execution was carried out on contract by the Mineral Exploration Corporation, Nagpur.

10. Mamleshwar temple, Mandhata, District East Nimar.— The damaged and decayed stone pillar was replaced by a new one matching the original.

11. Palace inside Fort, Chanderi, District Guna.— The overhanging parts of the dome of of the palace were stabilized by R.R. masonry and the damaged walls were underpinned. The buried structures were also exposed for restoration (pl. 112, 113).

12. Ganesa Gate, Gwalior Fort, District Gwalior.— In continuation of the previous year's work (*1981-82,* p. 116) the dislodged and out-of-plumb portion of the pillars and the ashlar face of the adjoining wall were reset. The fissures and cavities in the wall were filled by R.R. masonry in lime mortar. The cracks developed on the north and south faces of the gate were properly stitched. The missing masonry in the *kanguras* on the eastern side of the gate was also filled with new R.R. masonry maintaining original curves and contour.

The decayed roof of the gate was reconditioned with lime concrete maintaining proper slope for drainage of water. The cracked stone slab was also replaced (pl. 114).

13. Guard-room in Man Mandir Palace, Gwalior, District Gwalior.— In continuation of the last year's work (*1981-82,* p. 116) the broken and damaged cut-stone roof-slabs of the

monument were replaced by new ones. The dead lime concrete on the terrace was removed and relaid leaving proper provision for the drainage of water.

14. Gwalior Fort, Gwalior, District Gwalior.— The work of eradicating rank vegetation and face-lifting of the monuments inside the area was carried out.

15. Tapsi Math, Bilhari, District Jabalpur.— In continuation of the last year's work (*1981-82*, p. 116) the compound wall was underpinned and the entire roof surface treated with fresh lime concrete to arrest percolation of rain water.

16. Kankali Devi temple, Jigwan, District Jabalpur.— The roof of the sanctum and the porch of the temple were rendered water-tight . A high (2.60 m) barbed-wire fencing was also provided in place of the low one.

17. Shah-Burj, Mandla, District Mandla.—The fortification wall of the Burj was underpinned by R.R. masonry in mortar. The surface of the Burj was replastered giving it the original look

18. Nav-torana temple, Kher, District Mandsaur.— In continuation of the last year's work (*1981-82*, p. 116) the restoration of cracked and damaged beams, pillars, lintels, pilasters and stone slab posts, is in progress.

19. Stupa, Sanchi, District Raisen.— The casing of the stupa no. 3 was grouted and poin-ted. The broken flag-stone flooring of the upper *pradakshina-patha* was also replaced by new one.

20. Monastery, Sonari, District Raisen.— The bulged and collapsed dry stone wall was reconstructed after dismantling.

21. Mahadeva Temple, Pali, District Sagar.— The Construction of R.R. Masonry com-pound wall is in progress.

22. Karan temple, Amarkantak, District Shahdol.—In continuation of the last year's work (*1981-82*, p. 117) the restoration of cracked, bulged and dislodged of *jagati* completed.

23. Chaubara Dera Temple, No. 1, Un, District West Nimar.—_The fallen and dislodged stones on either side of the collapsed wall located on eastern side of temple were restored.

24. Mahakaleshwara temple, Un, District West Nimar — The joints in the *sikharas* of the temple were grouted and the roof surface was treated with fresh lime concrete by provi-

ding adequate slope for proper drainage of water. The surrounding area of the temple was also enclosed by constructing a stone wall.

Eastern Circle

ASSAM

25. Charaideo Maidan, Charaideo, District Sibsagar.— After removing wild yegetation, a pathway was laid.

26. Group of monuments, Sibsagar, District Sibsagar.— To stop seepage of water, an apron of brick ballast was provided after consolidating the soil around the monument.

27. Vishnudol, Joysagar, District Sibsagar.— The open joints were sealed and jaffry panels reproduced.

ORISSA

28. Simhanatha temple, Baideswar, District Cuttack.— The joints in the ceiling of *jagamohana* were watertightened and the collapsed portion of the compound wall was res tored. For the outlet of rain water a drain was provided.

29. Brahmeswar temple, Bhubaneswar, District Puri.— The stones in the subsidiary temples were relaid, missing portion restored and the damaged portions of the compound wall repaired.

30. Lingaraja temple, Bhubaneswar, District Puri.— In continuation of the previous year's work (*1981-82,* p. 120) pointing the joints in the main temple and restoring the wornout architectural members was done.

31. Rajarani temple, Bhubaneswar, District Puri.— The open joints, voids and fissures in the ceilings of the temple were grouted and pointed.

32. Apsidal temple on Khandagiri, Jagmara, District Puri.— In continuation of the last year's work (*1981-82,* p. 120) the missing masonry in the apsidal temple was replaced and bulged out portions were reset.

33. Sun temple, Konarak, District Puri.— An approach road to the main temple and drainage around the temple were provided.

34. Jagannatha temple, Puri District Puri.— In continuation of the previous year's work

(*1981-82,* p. 120) all the bulged out panels in the mini-temples were reset after consolidating and restoring missing ornamental features. Scattered stone pieces of verandah were refixed and worn-out central columns and beams in the *mukti-mandapa* strengthened.

WEST BENGAL

35. Madan Mohan temple, Bishnupur, District Bankura.- In continuation of last year's work (*1981-82,* p. 120) brick flooring was provided in the *Bhoga mandapa* of the temple.

36. Rasmancha, Bishnupur, District Bankura.— The pulverized lime terrace was restored.

37. Gopalji temple, Kama, District Burdwan.— The missing brick-work in the walls was restored.

38. Pir Bertram's tomb, Burdwan, District Burdwan.— Wall along the tank on western side of the tomb was strengthened and exposed portions of the wall plastered.

39. Gunamant Mosque, Gaur, District Malda.— The lime terracing of the roof of the mosque was relaid.

40. Adina Mosque, Pandua, District Pandua.— Two collapsed pillars and arches of arca-de around the central courtyard were restored to protect the superstructure from further damage.

41. Qutabushahi Mosque, Pandua, District Malda.— The works of relaying the terrace, watertightening of the top of the walls and stitching the damaged portions of the compound wall were undertaken.

42. Hazar-duari palace, Murshidabad, District Murshidabad.— In continuation of last year's work (*1981-82,* p. 120) the worn out wooden beams and portions in some rooms of the palace were replaced. In Madina mosque, the worn-out wooden architectural members and concealed ornamental work were extensively repaired (pl. 115,116).

43. Tomb of Begum Azimunissa, Murshidabad, District Murshidabad.- The cells below the terrace were repaired. The buried compound wall on the east was exposed and duly re paired. To avoid stagnation of water, drains were provided along the cells on the northern and southern sides.

44. Tomb of Shuja Uddin, Roshuibagh, District Murshidabad:- Floor of the tomb was relaid and the buried tanks on the either sides of the tomb were exposed and repaired.

45. Minar and Mosque of Murshid Quli Khan, Sabji Katra, District Murshidabad.— The missing portions of the walls, cells and domes were restored (pl. 117, 118).

Mid-Eastern Circle

BIHAR

46. Vikramshila Monastery and Stupa, Antichak, District Bhagalpur.— The brick masonry of the southern basement wall was restored in lime-surkhi mortar. Bricks used in the cornice were dressed to special size and curvature in conformity with the original. Special bricks were also manufactured departmentally for use during repairs. To drain off rain-water from the site an arterial intercepting drainage system was introduced.

47. Sculptures, Patharghatta, District Bhagalpur.— The northern side of the protected area was fenced with barbed wire.

48. Stupa, Nandangarh, District Champaran.— The dilapidated brick masonry in the north-eastern portion of the colossal stupa within the fortress was reset and recess pointed.

49. Excavated site, Kumrahar, district Patna.— The decayed portion of the pathway in the east leading to the excavated remains, was reconditioned.

50. Tomb of Bakhtiyar Khan, Chainpur, district Rohtas.— The pathway leading to the tomb and the apron around it, were reconditioned by laying fresh concrete.

51. Tomb of Sher Shah Suri, Sasaram, District Rohtas.— In continuation of previous year's work (*1981-82,* p. 121) the external surface of the dome was replastered with lime-*surkhi* mortar mixed with accoproof and black oxide in order to render the surface water tight.

52. Jami Mosque, Hadaf, District Santhal Pargana.— The disintegrated layers of con crete on domes were removed and relaid with a fresh layer of lime concrete. The decayed mortar from the masonry joints of the enclosure wall was removed, pointed with fresh lime-*surkhi* mortar and recessed.

UTTAR PRADESH

53. Excavated Remains, Sringaverapur, District Allahabad.— The structural remains of Tank 'A' were rendered water-tight. The earthen underlayer was consolidated with lime concrete shell to prevent erosions and under-cuts due to accumulation of water. The terraces and landings were consolidated with lime concrete.

54. Excavated Remains, Kausambi, District Allahabad.— In continuation of the previous year's work (*1981-82,* p. 121) upper three to four brick courses of Ghoshitarama monastery, defence wall, syenaciti and monastic remains near Asokan pillar were removed carefully and reset with *time-surkhi* mortar and finished with recessed pointing with toned mortar (pl. 119, 120) The earthen substrata was provided with lime concrete shell to prevent erosion by acc umulation of water due to rains. Besides this, adequate drainage was provided to regulate the flow of water.

55. Raja Mansingh's Palace, Kalinjer Fort, District Banda.— In continuation of the previous year's work (*1981-82,* p. 122) the floors of some of the rooms were reconditioned with lime concrete after dismantling the decayed ones.

56. Mirgadhara, Kalinjer Fort, District Banda.— The structural remains were rendered water-tight.

57. Nirvana Stupa, Kushinagar, District Deoria. — In continuation of the previous year's (*1981-82,* p. 122) work the restoration of the stupa is in progress. The brick masonry work in the superstructure upto *harmika* was completed and the installation of *Chhatravali* is in progress.

58. Nirvana temple, Kushinagar, District Deoria.— The temple was given a presentable look by providing a fresh layer of plaster after dismantling the decayed one. The electrical installations, fittings and fixtures were repaired.

59. Buddhist Remains, Kushinagar, District Deoria.— The pathway leading to the monastic remains was partly reconditioned by providing brick on edge laid in cement mortar finished with recessed pointing after dismantling the decayed lime concrete.

60. Man Mahal, Varanasi, District Varanasi.— The leaning balcony was reset in position in *kankar* lime mortar, after carefully dislodging the structural members. Besides the cracks and crevices in the roof of the complex were watertightened by dressing the cracks into 'V' notch and filled with *kankar* lime-mortar.

The broken stone slab in the ceiling of the observatory portion was replaced with a new one and reset in *kankar* lime mortar, finished with lime concrete terracing thereon. Lime concrete ledge was provided on the terrace of the observatory to prevent seepage of rain water from the joints. The floor of the verandah flanking south of the courtyard was reconditioned with lime concrete after dismantling the decayed one.

The walls of the verandah and the adjoining hall on the south of the courtyard was freed from soot deposit. The surface was washed and cleaned. The doors and windows were repaired and surface painted with synthetic enamel paint after removing old paint.

Northern Circle

UTTAR PRADESH

61. Agra Fort, Agra, District Agra.— In the ceiling of the southern room of Sheesh Mahal missing and decayed floral designs in moulded stucco plaster were restored.

Damaged veneer stones of fortification wall to the east of Amar Singh gate were replaced with new ones (pl. 121) and eight collapsed *Kangooras* between the first and second bastions were restored.

On the north facade of Diwan-i-Am brackets and some portions below *chhajja* were treated with special lime mortar. Plain and moulded inner surfaces of walls at the north-eastern and south-eastern bays of Diwan-i-Am were treated with special lime plaster matching the original.

62. Maulk Khana, Jami Mashid, Agra, District Agra.— A broken red sandstone latticed screen with floral design was replaced by a new one prepared as per original.

63. Taj Mahal, Agra, District Agra.— The worn-out and weathered red sandstones of convex moulding on the inner face of walls, moulded soffits of south-west minaret and the spiral steps from the bottom to the level of the first storey, were replaced by new ones. The door frames of iron *jalis,* fitted in door openings, were replaced with door shutters of the Mughal pattern. Similar shutters were also provided in all openings of the bastion at a south west angle of the Taj enclosure.

The roof of Sahelion-ka-Gumbad, at south-west angle of Forecourt, was watertightened and the missing *chhajja* stones were restored and broken ones replaced with new ones. The underpinning and pointing work on the enclosure of Khan-i-Alam on the river side and the south side was also carried out.

In the arched opening at the first floor of eastern Naubat-Khana an iron grill shutter was provided. Open joints of Chameli floor around the plinth of Marble terrace were also pointed.

64. Akbar’s Tomb, Sikandra, District Agra.— After removing the dead lime plaster from the ceiling it was replastered with fresh lime mortar. The collapsed compound wall at the back of western false Gate was restored (pl. 123, 124).

65. Roman Catholic Cemetery, Agra, District Agra.— The collapsed compound wall on the eastern side was reconstructed in rubble stone masonry.

66. Group of Monuments, Fatehpur Sikri, District Agra.— Open joints of flag-stones at the floor of the courtyard at Jodha Bai Palace were pointed. The dead lime concrete of a partly collapsed roof of Zenana *Rauza* was removed and a few broken brackets and lintel stones over them were replaced with new ones.

67. Laxmi Narain Temple, Tallihat District Agra.— Compound walls in rubble masonry were constructed on three sides of the temple.

68. Pathar Garh Fort, Najibabad, District Bijnor.- The collapsed portion of fortification wall was restored and the damaged north-eastern corner Burji repaired.

69. Rani Laxmi Bai Palace, Jhansi, District Jhansi.- Inner walls and main facade of the palace were treated with colour wash in snowcem matching the original shade after attending to patch repairs of plaster work.

70. Brahmanical and Jain temple, Sukara, District Hamirpur.— Dislodged stones of uneven floor of the temple were reset in position and recessed pointing was carried out in open joints of stone work.

71. Khakara Math, Mahoba, District Hamirpur.— The decayed terraced roof was water-tightened.

72. Kacheri Cemetery, Kanpur, District Kanpur.— The portions of broken compound wall were rebuilt and its outer surfaces plastered. Bulged out and dislodged veneer stones of graves were reset and open joints underpinned and pointed. Loose tablets were fixed on the inner face of the compound wall for their safety.

73. Residency Buildings, Lucknow, District Lucknow.— Collapsed compound walls at west and north-west sides were restored. The *kankar* road in the north of Residency buildings was also repaired.

74. Amjad Ali Shah's Mausoleum, Lucknow, District Lucknow.— The collapsed roof of second gateway was restored with wooden beams and planks matching the original,

75. Kazmain Buildings, Lucknow, District Lucknow.— After removing the dead plaster from the moulded portions of the northern facade of main entrance gate they were replastered with fresh lime mortar. Damaged portions of richly moulded northern facade of the second entrance gate were restored.

76. Imambara of Asaf-ud-daula, Lucknow, District Lucknow.— Elaborately moulded portions, floral designs on pillars and arches, of the western wing of the northern facade of the Imambara and its main gateway were replastered with fresh lime mortar matching the original.

77. Madan Mohan Temple, Brindraban, District Mathura.- Broken and missing portions of moulded red sandstones of the facade were repaired by inserting stone-pieces (Bidi) in gaps.

78. Govind Deo Temple, Brindraban, District Mathura.— Decayed and worn-out stones of the *garbha-griha* were replaced with new ones, *konjali* frames in the openings were painted in matching colour.

Southern Circle

KERALA

79. Fort St. Angelo, Cannanore, District, Cannanore.— The work of watertightening of the leaky terrace of the horse stables is in progress.

80. Bekal Fort, Pallikere, District Cannanore.— In continuation of the previous year's work (*1981-82,* p. 128) the exposed joints of the wall of the fort were pointed. The fallen and out of plumb wall was restored and the top water-tightened.

81. Mattancheri Palace, Cochin, District Ernakulam.— In continuation of the previous year's work (*1981-82,* p. 128) granite cut-stone slabs used as damp proof course were inserted at the plinth level of the main structure of the palace. The decayed wooden doors and win dows on the ground floor were replaced with those of teak-wood.

82. Rock-cut cave, Vizhinjam, District Trivandrum.— The protected area was levelled and dressed up. It was also fenced with a random rubble masonry wall and barbed wire in angle iron posts.

TAMIL NADU

83. Bhima Rathas, District Chingleput.— The work of watertightening the leaky terrace of the Bhima ratha is in progress.

84. Venkatesa Perumal temple, Tirumukkudal, District Chingleput.— The sunken and bulged-out walls of the various sub-shrines were dismantled after careful documentaion, The reconstruction over a firm foundation is in progress.

85. Choleswara temple, Melpadi, District North Arcot.— After careful documentation, the sunken and out of plumb *prakara* wall was dismantled and the work of reconstruction as per original is in progress.

86. Sri Chandramaulisvara temple, Nattery, District North Arcot.— In continuation of the previous year's work (*1981-82,* p.129) the resetting of bulged outwalls, beams and ceiling slabs of the *Mahamandapa* was carried out. The missing architectural members were also rep laced by new ones, and the terrace watertightened. The *Mahamandapa* and the open courtyard

around was paved with flagstones and the northern entrance was provided with a wooden door. The *gopura* on the northern side after dismantling was reconstructed over a firm foundation (pl- 125,126).

87. Rock cut cave temple, Siyamangalam, District North Arcot.— Ancient openings closed by later brick work above the lower terrace of the cloisters on either sides of the *mandapa* were removed and the original openings were exposed. The roof terrace was water-tiehtened and broken beams and ceiling slabs were replaced. The work is in progress.

The broken pillars, pillar capitals and beams in the *mandapa* of the Amman shrine were restored. The cracked lintel was replaced by a new one. The fallen and missing portion of the north-eastern wall of the Amman shrine (pl. 127) was reconstructed and the roof water-tightened with brick *Jali* concrete.

88. Jalakanteswara temple, Vellore, District North Arcot.— The walls and steps of the exposed tank between the inner and outer southern *prakara* of the temple were pointed. An iron railing was also provided around the tank.

89. Fort Vellore, District North Arcot.— Recess pointing and water-tightening the top of the northern side wall was done for preventing the growth of vegetation in the joints.

90. Aivarkoil Kodumbalur, District Pudukkottai.-In continuation of the previous year's work (*1981-82:,* p. 130) the sunken and out of plumb basement of the structure was reset as per the original.

91. Rock-cut cave temple, Kunnakudi, District Ramanathapuram.- The work of replacing the broken ceiling slabs and beams with new ones and removing of the decayed plaster from the leaky terrace is in progress.

92. Narasimhaswamy temple, Namakkal, District Salem.- The undulated stone flooring of the open courtyard around the Amman shrine was reset and the joints were recess-pointed.

93. Veerabhadraswamy temple, Chinnakavandanur, District Salem.- The plinth mouldings of the temple was exposed and dressed up. It was also provided with a proper slope to drain out rain water. The undulated stone flooring inside and outside the temple was reset and the joints were recess-pointed. The broken idol of Veerabhadra was carefully mended.

94. Krishnagiri Fort wall, Gingee, District South Arcot.- The work of restoring the fallen portions of the fort wall and the bastion in combination mortar is in progress.

95. Venkataramana temple, Gingee, District South Arcot.— The broken and missing ceiling slabs of the *kalyana-mandapa, utsava-mandapa* and the huge pillared hall were replaced

by new ones. The flooring of the open courtyard in between the pillared hall and the first *gopuram,* is provided with flag-stone pavement over a base of brick *jali* concrete. The work is in progress.

96. Brihadiswara temple, Gangaikonda Cholapuram, District Tiruchirapalli.— After careful documentation, the work of dismantling and reconstructing the bulged out wall on the southern and eastern sides of the temple was taken up (pl. 129, 130). The cracked ceiling slabs of the *mandapa* were replaced by new ones, and the roof, was made water-tight. The bulged out walls of the *mahamandapa* were also removed and reset as per original. The undulated stone flooring inside the temple was removed and reset and the joints were recess pointed. The damaged flush pointing existing on the northern and western walls was removed and recess pointing done after filling joints in stone masonry.

South Eastern Circle

ANDHRA PRADESH

97. Rani Mahal, Chandragiri, District Chittoor.— The loosened and cracked roof over the first-floor, its arched walls and out of plumb parapet wall (north-west corner) of Rani Mahal were reset. The roof from the inner side was underlined with iron mesh and concrete. The arched openings were neatly reset and plastered.

98. Ancient Site, Peddamudiam, District Cuddapah.— The entire protected area was fenced with barbed wire.

99. Charminar, Hyderabad.— The decayed plaster was removed in the ground floor at various places and replastered in matching colour and fabric as per the original one.

100. Group of Temples, Papanasi, Alampur, District Mahbubnagar.— Papanasi group of temples were dismantled and shifted to a safer and newly acquired site for their transplantation.

101. Sri Sangamesvara Temple, Vavelli, District Mahbubnagar.— Gearance is in progress at the new site meant for transplanation of the temple complex.

102. Ramappa Temple, Palampet, District Warangal.— The inner part of the *sikhara* was strengthened by providing fresh teak-wood beams and iron girders cross-wise at the base of each storey. The decayed wooden beams supporting the *antarala* brick work were also replaced. A special variety of less weight Siporex foam blocks shaped to the size of the old light-weight burnt bricks were introduced to fill the voids of the *vimanatalas.*

South Western Circle

GOA, DAMAN, AND DIU

103. Bom Jesus Church, Old Goa.— The pavement on the right side of the gate was re-laid in laterite stone slab and cement mortar. The north wall was also plastered. Door frames, and shutters were fixed in the ancillary building.

104. Lady Rosary Church, Old Goa.— The out of plumb and damaged altars were reset.

105. Se' Cathedral Church, Old Goa.- The decayed plaster of the church was removed and replastered in cement mortar with neeru finish. To prevent seepage of water, fresh flat tiles were laid in cement mortar mixed with crude oils.

106. St. Cajetan Church, Old Goa.— The pulverized facade, pillars, pilasters, niches, bases of the choir inside the church and the pillar were replastered in cement mortar.

MAHARASHTRA

107. Bibi-ka-Maqbara, District Aurangabad.— After raking out the loose and disintegrated plaster on the west face of the main tomb, the same was replastered in lime cement mortar in two coats. The missing floral designs and motifs were reproduced in lime, mixed with rangoli and mica powder to give an original marble finish.

Decayed plaster in the first bay of the main mosque abutting *langerkhana* was removed and the bay replastered in cement-lime mortar in two coats and given neeru finish.

108. Fort Daulatabad, District Aurangabad.— Loose rock formations were reinforced by drilling, and inserting iron pins in cement plaster and fixing wire mesh. Later the rock surface was treated with a finish. The exterior top portion of the dark passage was water-tightened after removing vegetation and slopes were plastered in cement mortar matching the original.

The decayed plaster of *Kacheri* building was replaced by fresh cement and lime plaster with three coats of neeru finish. All the openings were provided with M.S. angle iron grills. The floor was repaired with cement concrete. The work of resetting the missing corbels is in progress.

109.Jogeswari Caves, District Bombay.- The original rock-cut drain concealed under the debris was exposed to its base. Thereafter epoxy treatment was given to seal off all the cracks and crevices, and a layer of concrete was provided to stop the leakages.

110. Kondivate Caves, District Bombay.— The missing pillars, partition walls, door jambs were restored in R.C.C..

111. Kopeshwar Mahadeo Temple, Khidrapur, District Kolhapur.— The top of *nagar-khana* was watertightened in cement concrete. The cracks and voids developed on the rear wall of the main shrine were properly filled up by stone chips in cement mortar. Debris accumulated in the main entrance of the temple were cleared and the original basement was exposed. The entrance was also provided with a wicket gate.

112. Sivaneri Fort, Junnar, District Pune.— A breach in the fortification near Siva temple was restored by using coarse rubble masonry in cement mortar and given a finish.

Western Circle GOA,

DAMAN AND DIU

113. Church of Holy Jesus, Moti Daman, District Daman.— In continuation of previous year's work (*1981-82,* p. 132) dead lime plaster from the wall on the side of the main altar was removed and new plaster with neeru finish was provided. The work is in progress.

114. Church near North-western corner, Moti Daman, District Daman.— The fallen portions of the masonry walls of the main altar were strengthened by underpinning in lime cement mortar. The missing ashlar stone masonry and brick arches were reconstructed in lime cement mortar. After removing fallen debris portions of the walls and flooring were brought to light.

GUJARAT

115. Ahmed Shah's Mosque and Tomb, Ahmadabad, District Ahmadabad.— The roof and the domes were treated with lime mortar paste to prevent water percolation. The joints of the walls were recess pointed.

116. Astodia Gate, Ahmadabad, District Ahmadabad.— The wall joints were recess-pointed and missing portions replaced by new stones.

117. Baba Lauli's Masjid, Ahmadabad, District Ahmadabad.- The entire northern wall with the *jharokha* and portion of the wall on the western side, between the *mihrab* and the north-western corner portion was restored with new stones matching the original. The simple mouldings with floral designs were also restored. The work is in progress.

The bulged-out portion of the wall on the western side was reset. The concrete patches on the flooring were removed and provided with new paving in Dhrangadhra stone.

118. Bhadra Tower, Ahmadabad, District Ahmadabad.— The portion of the brick wall on the northern gateway was strengthened by underpinning and recess-pointing in combination mortar.

119. Harappan Site, Lothal, District Ahmadabad.— The earthern bund provided for checking the flow of rain water into dockyard from the sides was levelled with an outward slope. Silt from the dockyard was removed. The work is in progress.

120. Saiyad Usman's Mosque and Tomb, Ahmadabad, District Ahmadabad.— The domes and the roof were water-tightened with lime cement mortar. The wide joints of the plinth masonry were recess-pointed.

121. Pavilion before the Tomb of Shaikh Ahmed Khata Ganj Bakhshm, Sarkhej, District Ahmadabad.— The loose and out-of-plumb *chhajja* stones were reset with copper clamps.

122. Tomb of Mahmud Beghra, Sarkhej, District Ahmadabad.— The fallen portion of the northern wall was restored as per the original. The sunken paving stones were reset in lime mortar maintaining proper slope.

123. Dvarakadhisha group of temples, Dwarka, District Jamnagar.— The work of dressing the stones for replacing the workout cracked and damaged pillar bases, pillars, capitals, lintels, etc, is in progress.

The weather-affected pillars and capitals of the *sabhamandapa* in Devakiji's temple were replaced by stones as per the original. The work is in progress.

In Trivikramji temple, the weather-affected stones of the outer wall of *thegarbha-griha,* were restored upto the *vimana.* The work is in progress.

124. Bawaman's Mosque, Champaner, District Panchmahal.— The work of removing dead lime concrete from the roof and resetting loose stones of the arches is in progress.

RAJASTHAN

125. Ancient Mound, Pilibangan, District Ganganagar.— In order to stop encroachment, the work of fencing the mound is in progress.

126. Ancient Mound, Rang Mahal, District Ganganagar.— The work of fencing the site is in progress.

127.Jagat Siromani temple, Amber, District Jaipur.- The fine joints on the vaulted roof of the *sabhamandapa* were filled with epoxy resin as a measure against seepage of water for safety of paintings inside. The high basement on the northern side was strengthened by

a fresh coat of plaster.

128. Fort including ancient temples, Jaisalmer, District Jaisalmer.— The bulged-out portion of the bastion near Nichi Pole was dismantled and rebuilt in lime cement mortar as per the original. The damaged stones were replaced with new stones.

129. Sas and Bahu Temples, Nagda, District Udaipur.— The missing marble stone flooring of the plinth was replaced on a concrete bedding.

Monuments Maintained by the States

Special repairs to the following monuments protected by the states were carried out:

ARUNACHAL PRADESH

1. Tawang monastery, Arunachal Pradesh.— The Historical section of the Research Department of the Government of Arunachal Pradesh has taken up conservation work at the Tawang monastery in consultation with the Deputy Superintending Archaeologist, Eastern Circle, Calcutta. The first phase of the work is completed.

GUJARAT

The special repairs carried out in the following monuments, protected by the states, were as follows:

2. Shakti Kund,Akhaj .District Mahesana .

3. Bhimchori (Siva temple Kalesvari) Lavana,District Panchmahal.

4. Group of temples (Siva temple),Sant,District Panchmahal.

5. Lakhena Jaina temple, Abhapur, District Sabarkantha.

6. Sharnesvar temple, Abhapur, District Sabarkantha.

7. Kund, Gambhirpura, District Sabarkantha.

8. Panchayatana temple, Parbadi, District Surendranagar.

KARNATAKA

9. Gopuram, Virupaksha temple, Ham pi. District Bellary.- The mutilated stucco figures on the *gopuram* were restored and the *gopuram* was colour washed with ivory shade maintaining their original shape and colour. All the openings of the main *gopuram* were also repaired by providing grilled windows to save the inner course from monkey menace. An 'I-section girder' was inserted in the cracked beam supporting the main *gopuram.*

10. **Nagreshvara temple, Hampi, District Bellary.-** The sunken pillars, floors, out-of-plumb western wall and the pavement of the excavated temple were reset. The temple roof was treated with fresh waterproof course. The conservation of the *mandapas* in the Virupaksha Bazar is in progress.

11. **Nobleman's palace, Hampi, District Bellary.—** The lime plastered floors of the excavated remains were restored and conserved by providing lime mortar edging. The fallen basements were reset, the walls recess-pointed and the tops made water-tight.

The conservation work of the following monuments was completed:

12. Nagai Remains, Chitapur, District Gulbarga.

13. Sri Lakshmiramanaswamy temple, Palace Complex, District Mysore.

The conservation work of the following monuments is in progress:

14. Kalimasjid, Lakshmesvara, District Dharwad.

15. Sri Chennakesvar temple, Hullekere, District Hassan.

16. Raja's tomb, Mercara, District Kodagu.

17. Mahabaleswara temple, Chamundi Hills, District Mysore.

18. Sri Prasanna Krishnaswamy temple, Palace Complex, District Mysore.

19. Kalleswara temple, Aralaguppe, District Tumkur.

MADHYA PRADESH

20. Gond Mahal, Islamnagar, District Bhopal.- After clearing debris from the monument, basement and floors;staircase and fountain were exposed.

21. Rani Mahal, Islamnagar, District Bhopal.- Roofs were rendered water-tight and,

made strong by providing extra beams and cement plaster matching the original colour mixed with waterproofing compound. Damaged floors were relaid. Flag stone flooring of apron was laid in proper sloping after providing cement concrete bed. Dilapidated walls and parapets were repaired by underpinning and restoring the missing parts. The shutters of teak-wood were provided in rooms, corridors and halls for security purpose.

22. Gandharvapuri, District Bhopal.— The protected area and the loose sculptures were fenced with barbed wire.

23. Malkham Kothi, Nalchha, District Dhar.—.Debris clearance from the monument was done, thus exposing the basement and a few sculptures.

24. Samadhi of Maharani Lakshmi Bai of Jhansi, District Gwalior.— A wall was constructed in the west side of the *samadhi,* to save the surrounding area of monument and the garden from the stream.

25. Rock shelter, Jinghri, District Katni.— The protected area was demarcated by fixing cushion pillars and the approach road constructed.

26. Chaturbhuj temple, Orcha, District Tikamgar.— lime mortar was used for the repair of the walls.

27. Jahangir Mahal, Orcha, District Tikamgarh.—The repairs to the flooring was done with cement concrete and patch lime-mortar. For proper water supply a centrifugal pump was fitted in the wall near the hammam and pipe-line laid.

28. Raja-Mahal, Orcha, District Tikamgarh.— For repairs in patches cement concrete bed flooring with lime-mortar was used. The wild vegetation was removed and roads were constructed to approach different monuments.

29. Garh, Kundhar, District Tikamgarh.— Rank vegetation in and around the monument was eradicated and approach roads were constructed.

30. Lakshmi temple, Orcha, District Tikamgarh.— The pillars of the *mandapa* hall were repaired by special lime-mortar.

ORISSA

The conservation work was carried out- in monuments. Important amongst them are mentioned below:

31. Bhadra-kali temple, Bhadrak, District Balasore.

32. Yudhisthira group of temple, Dhanisha, District Cuttack.

33. Charchikeyee and Kapileswar Mahadeva Temple, Kudeswar, District Cuttack.

34. Saptamatrika and Ajackapada Bhairava temple, Sathalpur, District Cuttack.

35. Dadhivamana temple, Khadiala, District Kalahandi.

36. Batrisa-Simhasana temple, Nandapur, District Koraput.

37. Ramanidhi Dev temple, Rameswar, District Puri.

38. Sakhigopal temple, Sakhigopala, District Puri.

PUNJAB

39. Palace of Maharaja of Patiala, Qila Androon, District Patiala.— Repairs were carried out by way of water-tightening the leaky roofs adn filling of cracks in the walls. In addition toilet facilities were aranged for the public.

40. Mughal Sarai Sambhu, District Patiala.— Special repair works were carried out by way of debris clearance from the cells and exposing the floors (pl. 131,132). The monument was also beautified by way of extensive landscaping.

WEST BENGAL

41. **Gouranga temple, Hattala, Hambazar, District Birbhum.—** Conservation of the temple is now in progress.

42. **Pathan Palace, Adina, District Malda.—** Damaged minar in the palace was restored strengthening its foundation and wall with suitable mortar, keeping the original alignment; with the exterior face of the minar also pointed.

ARCHAEOLOGICAL CHEMISTRY

Treatment of Monuments and Paintings[1]

DELHI

1. Diwan-I-Am, Red Fort, Delhi.— The work of chemical treatment and preservation of Pillared hall, plastered parapet wall, burjee and cornice of Diwan-i-Am was continued from previous year. Liquid ammonia, teepol and dilute acetic acid were used for the removal of vegetational growth and lime wash deposits. The treated areas were preserved with 3% solution of polyvinyl acetate in toluene.

2. Diwan-I-Khas, Red Fort, Delhi.— Plain marble surface and cornice made of marble of the northern corridor of Diwan-i-Khas facing the hamman were cleaned. They were having patchy vegetational growths and deposit of smoke emitted from the exhaust of the vehicles passing on the proximate road. These areas were successfully cleaned by brushing and swabing with cotton wool and applying an aqueous solution of ammonia and teepol.

3. Misra Yantra, Jantar Mantar Complex, Delhi.— The semicircular marble strips of Misra Yantra were covered with thick deposit of dust and dirt, greasy matter derived from the repeated touches of the visitors, black deposits of the smoke emanated from passing vehicular traffic on the nearby thoroughfare and mild growth of vegetation here and there. The entire Yantra was subjected to chemical treatment for the removal of deposits and accretions using liquid ammonia, teepol and organic solvents like acetone and benzene. After chemical cleaning, the treated areas were preserved with 3% solution of perspex in toluene.

4. Samrat Yantra, Rama and Jai Prakash Yantra, Jantar Mantar, New Delhi.— Patchy growths of moss due to monsoon, deposits of dust and dirt due to the monuments being in the open, were removed from the surfaces of these monuments using chemicals like ammonia and teepol and gentle brushing with nylon brushes. After making the area free from all accretions it was preserved with perspex solution in toluene.

5. Feroz Shah's Tomb, Hauz Khas, Delhi.— Stucco paintings on ceilings of the hemispherical dome and walls of Feroz Shah Tomb which were covered with thick deposits of dust and dirt, muddy accretions, wasp nests, cocoons were chemically treated and brought to its

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'information from Director (Science) of the Chemistry Branch of the Survey except no. 36 and 37which was received from Directorate of Archaeology, Government of West Bengal.

original lustre by using organic solvents like benzene, acetone and pyridine. The treated areas were preserved with 3% solution of polyvinyl acetate in toluene.

6. Asokan Pillars, Kotla Feroz Shah, Delhi.- The three storeyed Asokan Pillar structure bearing Asokan edicts was slightly affected with patch vegetational growths and some paint scribblings. Vegetational growth was removed by using organic solvents like butyl acetate. Sodium pentachlorophenate was applied as fungicide and finally, the monument was preserved with 3% solution of polyvinyl acetate in toluene.

7. Bara Gumbad Mosque, Lodi Tomb Complex, Delhi.— The walls, tomb and the arch ways of this structure were profusely, decorated with designs and inscriptions in stucco work and painted in multicolours. The ceilings of the three tombs of this structure were decorated with painted stucco floral designs. All these were covered with thick black deposits apart from dust and dirt. At places, on the walls of the ceiling white streaks were also noticed. All the accretions and deposits were removed by using chemicals like ammonia, teepol and organic solvents like benzene, acetone and triethanol amine. The original lusture of the colours have been brought out after treatment. Area treated was preserved with 3% solution of polyvinyl acetate in toluene.

8. Mohammad Shah Tomb, Lodi Tomb Complex, Delhi.— The niches above the arched openings and the central ceiling found profusely decorated with stucco floral designs were found covered with superficial accretions of dust and dirt, insect's nests and bird's droppings. The accretions were successfully removed by using liquid ammonia and teepol in aqueous medium. Benzene and toluene were used for the removal of greasy matters. Treated areas were preserved with 3% solution of polyvinyl acetate in toluene.

9 Sikander Lodi's Tomb, Lodi Tomb Complex, Delhi.— The niches above the arched openings of this tomb decorated with floral designs made of glazed tiles of different colours. Due to passage of time, thick deposits of dust, dirt and bird's nest were found on these decorations. Birds' nests were removed mechanically after moistening the surface. Other superficial accretions were removed using dilute solution of ammonia and teepol and gentle brushing with paint brushes. The treated areas were preserved with 3% solution of polyvinyl acetate in toluene.

10. Red Fort, Delhi.— The entire peripheral wall of Red Fort facing the Ring roadside from Azad Gumbad to Salim Bridge was elaborately treated by using solutions of liquid ammonia and teepol for the removal of vegetational growths. Hardened accretions and calcareous deposits were removed by using dilute acetic acid with repeated applications. The remnants of the acid, if any, were neutralized with a dilute solution of ammonia and final washing with copious flow of water for the removal of last traces of the alkali. After allowing the moisture to evaporate the treated areas were preserved by the application of two coats of

5% solutions of perspex in toluene with a view to consolidate the flaking stone surfaces.

11. Ghiyashuddin's Tomb, Tughlaqabad, Delhi.— Vegetational growth over the red sandstone gateway of the tomb and over the arched openings of octagonal drum of marble dome were cleaned using ammonia. Internal marble ceiling and red sand stone wall were cover ed with thick muddy accretions which were cleaned chemically and preserved with 3% perspex solution in toluene.

GOA, DAMAN AND DIU

12. Old Goa.— Masking of colours due to old preservative and accumulation of dust and dirt over some forty-two panels and canvas paintings was noticed. To get rid of these masking agents, different organic solvents like cellosolve, rectified spirit and butyl acetate were used. Relining of canvas paintings was also done wherever necessary while at other places sagging canvas had to be restretched. Finally mastic varnish was used as a preservative (pl. 133,134,135,136,137, 138,139, 140).

About one dozen polychrome sculptures were chemically cleaned and preserved after giving an insecticidal treatment. Missing portions were consolidated and restructured. Two iron anchors in St. Cajethan Church and Basilica of Bom Jesus were also cleaned chemically and grills were burnished using soft satin cloth. Areas attacked by insects were cleaned using creosote and pyrethrum. Holes and cracks were suitably filled and matched with colour.

One of the two big canvas paintings in the church of St. Francis of Assissi were cleaned chemically and preserved using mastic varnish.

GUJARAT

13. Rani Sipri's Mosque and Tomb, Ahmadabad, District Ahmadabad.— Thick vegetational growth over exterior decorated stone *jali* were removed with the help of liquid ammonia and teepol. Cleaned *jali* was preserved after applying fungicide.

14. Tambekarwada, Vadodara, District Vadodara.— Wall paintings depicting scenes from Mahabharat on the eastern wall in the first floor of Tambekarwada were chemically cleaned and preserved. The colours were rendered bright and their tendency of flaking off was checked by impregnating the painted surface with the transparent solution of synthetic preservative.

HARYANA

15. Ibrahim Tomb, Narnaul, District Narnaul.— Southern wall of the tomb was cleaned using liquid ammonia and teepol. Cleaned wall was preserved with 3% solution of Polyvinyl acetate toluene after applying fungicide.

HIMACHAL PRADESH

16. Chamba Chibbo Gumpha, Tabo, District Lahaul Spiti.— The wall paintings on the side and back walls of the main figure of sitting Buddha were cleaned (pl. 141, 142) using a mixture of organic solvents. The treated paintings were preserved with 3% solution of polyvinyl acetate toluene.

17. Chomulong Gumpha, Tabo, District Lahaul Spiti.— Paintings on eastern, western and southern walls were cleaned using different mixtures of organic solvents. Treated paintings were preserved with 3% solution of polyvinyl acetate.

JAMMU AND KASHMIR

18. Pathar Massjid, Srinagar, District Srinagar.— The arches on the left-hand side of the entrance and front facade were cleaned with dilute ammonia solution. Cleaned surface was given fungicidal treatment and preserved with 3% solution of polyvinyl acetate.

19. Sunchek, Monastery, Alchi, District Leh.— Paintings on the western, northern and southern wall and on the ceiling of ground floor were cleaned (pl. 143,144 and 145, 146) with mixtures of organic solvents. Treated portions were preserved with 3% solution of polyvinyl acetate.

KERALA

20. Vadakkunathan Temple, Trichur, District Trichur.— The wall paintings on *nandi-mandapa* were lying covered with thick coating of soot and oily matters in addition to superficial accretions. These were removed using triethanolamine, morpholine, N-butyl alcohol, ethyl alcohol and toluene with turpentine as restrainer. Lacunae, wherever existed, were suitably filled with plaster of Paris and were merged with paintings.

MADHYA PRADESH

21. Kandariya Mahadev Temple, Khajuraho, District Chhatarpur.— The temple is under chemical cleaning. Growth of micro-organisms was removed using dilute ammonia solution and teepol. lime wash, present on some portions was removed with dilute acetic acid solution.

22. Bhojshala, District Dhar.— Vegetational growth on outer surface of the monument was removed using dilute liquid ammonia and non-ionic-detergent solutions, while lime wash depositions on inside the stone surface was cleaned using 1-3% aqueous solution of acetic acid. The cleaned areas were given a treatment of fungicidals viz., Zinc silicofluoride and santobrite solutions.

23. Neelkantheshwar Temple, District Vidisha.— After cleaning superficial dust and dirt, the vegetational growth on the outer structure of the temple were cleaned with 3% aqueous solution of ammonia, lime wash inside the temple was removed using 1-3% aqueous solution of acetic acid. Smoke deposits were cleaned using different organic solvents. After complete cleaning fungicide was applied followed by a coating of 3% polyvinyl acetate solution as preservative.

MAHARASHTRA

24. Ajanta Caves, Ajanta, District Aurangabad.— Removal of old shellac, dust, dirt, bat, birds droppings and other unknown accretions continued in Cave 17 at panels 10 & 11 on south wall (pl. 147, 148) and 149, 150). Quick bleading of black outline colour was checked with polyvinyl acetate coat before chemical cleaning. Some designs on pillars 5 and 6 were also exposed by chemical treatment.

To check the detachment of the paintings and flaking of pigment layers, consolidation work was continued in Cave 6 Buddha chamber, Cave 17 east wall and of Cave 2 ceiling using suitable adhesive like polyvinyl acetate solution or Fevicol and plaster of Paris as filler with matching earth colours.

Pyrethrum insecticidal solution was sprayed every month in Cave 1, 2 and 17 to eradicate harmful insect activities. A new technique was adopted to remove chalkiness hiding the new paintings in Caves 10, 16 and 17 employing cellulose acetate sheets which were first fixed temporarily on the painting and were lifted slowly after some time when it was bonded sufficiently with the accretions, without harming the pigment layers. Cleaned surfaces were preserved with 3% polyvinyl acetate solution.

ORISSA

25. Lord Jagannath Temple, Bhubaneshwar, District Puri.— Exposed portions of walls of *vimana* of the temple on the north and north-east sides were under chemical treatment using 2 to 5% aqueous solution of vinegar. The work is in progress.

26. Mitreswar Temple, Bhubaneshwar, District Puri.— Jagmohan of this temple was cleaned of vegetational growths using 2% ammonical water and was applied with fungicide.

27. Rajarani Temple, Bhubaneshwar, District Puri.— Chemical treatment of *jagmohan* of this temple was conducted beginning from the top, using 1 to 2% ammonical solution.

RAJASTHAN

28. Kalika Mata Temple, Chittorgarh, District Chittorgarh.— Concealed beautiful small sculptures and carvings of ceiling and pillars were exposed by removing thick coating of lime plaster and lime wash mechanically as well as using dilute acetic acid.

TAMIL NADU

29. Kailasanatha Temple, Kancheepuram, District Chengleput.— Out of 1125 sq m, 603 sq m of the sculptures in *vimana* section were cleared of vegetational growths, lime wash and soluble salts with ammonia and teepol and finally with distilled water. Cleaned area was then preserved with 2% solution of polyvinyl acetate after giving a coat of 3% solution of santobrite.

30. Fort Museum, Madras, District Madras.— Two photoprints of the museum were chemically treated after removing them from the mounts. Prints were first washed with water to remove superficial accretions and were then immersed in a mixture of 2% aqueous solutions of sodium hypochlorite and formaldeyde so as to bleach them to expose their original colours. They were then thoroughly washed with water, dried and remounted suitably.

31. Brihadesvara Temple, District Thanjavur.— Paintings in Chambers 8, 9 and 11 of the above temple were covered with dust, dirt, soot and oily accretions. They were removed using appropriate mixtures of triethanolamine, cellosolve and diacetone-alcohol, etc. Wherever lacunae existed, were filled with plaster of Paris. The broken edges were similarly filletted by using consolidants and reintegrated to merge with the paintings. The treated areas were finally preserved with 2% polyvinyl acetate.

UTTAR PRADESH

32. Itmad-Ud-Daula, Agra, District Agra.— Paintings showing beautiful floral and plant designs in multicolours, executed on highly finished lime plaster on the marble walls in the western enclosure of the monument, were covered with old darkened preservative, nests of insects, dust, dirt and smoke deposited from the burning of *agarbathi* (incense sticks) and lighting of wax candles. Dust and dirt were removed by cotton swabbings and marks of wax; insect activities were removed with the help of benzene and acetone together with turpentine as a restrainer. Smoke and sooty accretions were eradicated using a mixture of triethanolamine and methanol. The thick darkened coat of old preservative was eliminated by repeated application of toluene and methylated spirit, exposing the painted figures. Bulges and edges of painted plaster were fixed by using suitable adhesive and plaster of Paris respectively. Finally paintings were preserved with a dilute solution of polyvinyl acetate.

33. Jama Masjid, Agra, District Agra.— Work of art on the marble surface of lower border in the main hall on the western wall in north, south side of the *masjid* were exposed by removing the layers of dust, greasy and smoky deposits with the help of different mixtures of organic solvents.

34. Taj Mahal, Agra, District Agra.— Area of the main western arch, below the arabic inscriptions, was covered with dust, dirt, smoke- and beehive deposits with the result that the

surface became stained to a brownish yellow tint. The smoky patches, dust and dirt were removed with the help of ammonia and emulsified solutions. The yellow stains were removed with the help of a dilute solution of hydrogen peroxide and alcohol. The beehive wax and other surface deposits were removed with the help of different organic solvent mixtures. The efficacy of preservatives for physico-chemical protection of chemically cleaned area is under study.

35. Dewan-I-khas, Fatehpur Sikri, District Agra.— Dust, dirt, bats' excreta and other surface accretions, viz. oil, soot etc. were cleaned from the intricate carvings and stone structures in the interior of Diwan-i-Khas. 1% solution of zinc silicofluoride was applied over the cleaned areas followed by 2% solution of polyvinyl acetate as preservative.

WEST BENGAL

36. Gauranga temple, Ilthambazar, District Birbhum.— Suitable arrangements were made to undertake the fungicidal treatment of the terracottas which depict scenes from the Ramayana and the Purana.

37. Pathan Palace, Adina, District Malda.— The chemical treatment of bricks embellished with brilliant blue, deep green, etc. of Pathan Palace was performed, followed by a coat of preservative solutions of 6% vinyl acetate.

Treatment of Excavated objects and Museum exhibits[1]

38. Sixty-two copper coins, ninty-four copper antiquities and ten bronze objects (pl. 151, 152, 153, 154) were chemically treated for the removal of encrustation and preserved.

39. Forty-five iron objects, one hand grenade, three pistols, and one sword were chemically cleaned and preserved.

40. One hundred and twenty-eight silver coins were chemically treated, cleaned and preserved.

41. Seventeen flags and one farman were chemically treated and cleaned. The flags were dry washed with equi mixture of (i) acetone and toluene (ii) methanol and acetone, together with a few drops of ethylene dichloride. The flags were deacidified with ammonia and

[1] Information from : 38-43 Director (Science) of the Chemistry Branch of the Survey; 44-49, Department of Archaeology and Museums, Government of Madhya Pradesh: 50, Directorate of Archaeology, Government of West Bengal; 51-54, National Research Laboratory for Conservation of Cultural Property, Lucknow.

strengthened by giving a proper support of very fine transparent cloth.

42. Twelve paintings, three photographs, seven glass paintings, ten oil paintings and three canvas paintings were chemically treated by using different non-polar organic solvents, viz. benezene, methanol, acetone, toluene, N-hexane, ethlene dichloride, triethanolamine, turpentine oil, etc. Fly marks were removed by hydrogen peroxide. Paintings cleaned in all respects were deacidified and preserved.

43. Five hundred and ten pages of manuscript of QURAN were separated, deacidified and preserved. The preserved leaves were enveloped in butter papers for protection and support.

44. Sculptures lying in the open courtyard were subjected to chemical treatment for eradication of mossy growth, lichen, fungus and removal of dust and dirt accumulation, calcarious deposition, redoxide, soluble salts by application of distilled water, 2% ammonia solution, detergent-teepole, very dilute hydrochloric acid, sodium-meta-phosphate, organic solvents and paper-pulp treatment.

45. Maratha Paintings in Rajwada Palace which were coated with lime wash and varnishes were cleaned with suitable solvents. The damaged Gaja-Laxmi painting was restored by the joining two pieces with the araldite and iron rods.

46. A number of stone sculptures in the Dhubela State Museum were cleaned.

47. Fifty stone sculptures in the Bilaspur Museum were cleaned chemically and mechanically.

48. One hundred stone sculptures in Vidisha district museum were chemically treated.

49. Silver coins in the Gwalior Gujari Mahal Museum which deteriorated by tarnishing effect, were cleaned. After cleaning, 2% polyvinyl acetate in toluene was applied as a preservative. One hundred copper coins were cleaned by application of alkaline-Rochelle salt treatment and sodium carbonate treatment.

50. The fungicidal treatment to the decorative plaques of the Jami Mosque at Old Mida, District Malda was undertaken.

51. Fifty-one miniature paintings and many other paintings belonging to different organisations were treated.

52. An illustrated manuscript *"Sikandernama"* belonging to the Dogra Art Gallery,

Jammu was treated and restored. It had forty-one illustrations and the resotration work on '*Shahnama*' has started.

53. Seven textiles and the restoration of some flags is in progress. One large size *pichwai* was restored. The treatment to three rare *thankas* was started.

54. Ninety-one iron objects, and forty copper objects were cleaned and treated.

Research and Analysis[1]

55. Several specimens of iron and copper from different parts of the country, were analysed for their constituents and structures.

56. Eleven specimens of marble and one specimen of red stone from Agra, eleven specimens of sandstone from Khajuraho were analysed for their composition and structure by using conventional as well as modern methods. Physical parameters like porosity, specific gravity, pH and hardness were determined for their characteristic behaviour towards the surroundings. These samples were examined by using most modern and sophisticated methods like X-ray diffraction, X-ray flourescence, and scanning electron microscopy.

57. Two specimens of mud plaster and twelve specimens of soil were analysed for their constituents by using conventional wet methods. Amount of organic matter, carbon dioxide, phosphate, etc. were estimated.

58. Different earthen colours from Ajanta were collected and analysed for their composition. Physical properties were determined for their behaviour towards their surroundings.

59. Thin sections of stone specimens were prepared for their microscopic and minerological study. Mechanical analysis of these specimens were also done. Mechanical analysis of thirteen soil specimens was carried out.

60. Effect of sulphur-dioxide under different conditions of humidity, temperature, etc. on preserved and unpreserved specimens of marbles were studied by using most sophisticated instruments, viz. gloss reflectometer, infrared spectroscope and scanning electron micro scope etc. The microchanges under different conditions on marble specimens were studied. Physical parameters such as porosity, permeability, hardness, compressive strengths,etc. were determined. Efficacy of these parameters and different preservatives under different conditions were also studied. Mud plaster, having the composition similar to the mud plaster used at

[1] Information from : 55 - 64, Director (Science) of the Chemistry Branch of the Survey; 65-67, Deccan College Post-graduate and Research Institute, Pune and 68-77, National Research Laboratory for Conservation of Cultural Property, Lucknow.

Ajanta were prepared for studying its behaviour towards the (i) absorption of the earthen colours collected from Ajanta and a study was made regarding its alteration and fading under different conditions of humidity and temperature and, (ii) mechanical behaviour towards the shrinking, cracking and drying stresses developed were also studied in detail under different conditions of temperature, humidity and moisture contents.

61. Literature was collected and notes were prepared for anatomical study, identification and preservation of ancient woods. Cross sections of some of the ancient woods were prepared in three different directions, viz. radial, tangential and longitudinal, were studied. Some standard samples of wood were collected from F.R.I. Dehra Dun for preparing their cross sections for reference and comparison. Research on finding a suitable preservative characteristic to a particular wood under different climatic conditions is in progress. Technique to close the cracks in wood by swelling and then setting the wood in this state is also under progress. The future procedure as envisaged is to try the various thermo-plastic and thermo-setting resins. Water based materials are also included in the list of trials.

62. Literature on structural study and identification of ancient fibres was collected. Samples of different fibres from different parts of the country were collected. Slides of different known fibres were prepared for the study of their structural behaviour, references and comparison purposes.

63. Various ancient samples of iron and copper were prepared for microscopic examination and for the study of their structures.

64. A well equipped laboratory is functioning at Agra to study the effect of Air Pollution on Taj Mahal and other historical monuments. Automatic sulphur dioxide analysers are helping to keep a close eye over the levels of sulphur dioxide in the vicinity of Taj and Sikandra. In addition, sulphation studies are already being conducted by the laboratory staff, velocity, variations of temperature and humidity are also being recorded to study the factors which may affect the stone monuments. Dust fall studies are also being carried out in order to see the effect due to sedimentation of particulate matters. The efficacy of various preservatives over the marble to protect it against pollutants is also being examined. The measurements of the above parameters are essential in the programming of air quality assessment and evaluation of the effectiveness of the abatement programme.

65. In order to study the chemical and mineralogical composition of buried layer usually found in between two cultural periods, B.C. Deotare collected several soil samples from the archaeological sites of Nagda, Kayatha, Dangwada and Inamagaon. The following observations were made on the results of the analysis:

1. Organic carbon was high in the samples of the buried layer while it was relatively

low in habitational deposits. The values of organic carbon in the surface sample of modern soil was comparable to that of the buried layer.

2. Carbonate content was in traces, in the buried layer from Nagda while underlying and overlying deposits contained high carbonate.

3. Phosphate content was very low in the samples from the buried layer and modern soil, and considerably high in habitational deposits indicated a break in habitation during the repective periods.

4. Total Fe and sodium-di-thionite-citrate extract soluble Fe content was relatively high in the buried layer and modern soil, whereas it was low in habitational deposits.

5. Silt fraction was considerably high in the buried layer than in the underlying and overlying habitational deposits. X-ray analysis which was in progress may throw more light on the mineralogial pattern so as to confirm the origin of the buried layer.

From the above observations it appeared that the buried layer was not a *in situ* soil but a transported sediment retaining some characters of soil. As it was a regional phenomena it suggested that the sites were deserted possibly due to high floods.

66. In continuation of the last year's work (*1981-82* pp. 146-147) under the research Project' "Chemistry of archaeological bones from India" R.V. Joshi, A.A. Kshirasagar and V.D. Gogte, analyzed the archaeological bone samples from Gufkral (Jammu and Kashmir), Vagad (Gujarat), Runeja (Madhya Pradesh) and the Pleistocene fossils from various regions of India. A few of the fossils were examined by SEM and X-ray diffraction methods. The results obtained are given below.

Gufkral (Jammu and Kashmir)

	Culture	Layer	%F	%P	%O.C.	$\%CaCO_3$	$100F/P_2O_s$
1.	Historic	(1)	0.046	12.12	3.86	14.85	0.166
2.	Megalithic	(3)	0.028	12.12	4.53	12.61	0.101
3.	Neolithic Cer.	(4)	0.042	11.75	4.41	16.49	0.156
4.	Neolithic Acer.	(7)	0.046	10.75	4.54	13.58	0.187
	Runeja (Madhya Pradesh)						
1.	Malwa	(10)	0.057	9.75	0.336	34.78	0.255
2.	LateAhar	(13)	0.057	11.25	0.315	24.44	0.221

	Culture	Layer	%F	%P	%O.C.	$\%CaCO_3$	$100F/P_2O_5$
3.	Lower Malwa	(16)	0.030	11.75	0.304	26.32	0.11
4.	Ahar, Malwa	(17)	0.034	12.19	0.273	25.38	0.122
Vagad (Gujarat)							
1.	Chalcolithic	(1)	0.061	10.75	0.515	39.48	0.248
2.	Chalcolithic	(2)	0.087	10.00	0.651	41.36	0.380
3.	Chalcolithic	(3)	0.053	9.75	0.483	34.78	0.237
4.	Chalcolithic	(4)	0.053	9.06	0.451	39.48	0.255

The results of analysis of Pleistocene fossils are given below:

Site	%F	%P	%N.	$\%CaCO_3$	$100F/P_2O_5$
Kashmir Karewa					
Sombur	1.525	13.12	0.068	14.65	5.076
Siwalik Mirzapur	1.45	9.5	0.026	27.33	6.66
Narmada valley					
Burmanghat	2.21	12.5	0.022	18.16	7.72
Godavari valley					
Jakegaib	1.116	8.12	0.026	42.24	6.00
Manjra valley					
Ganjur	0.4	3.62	0.026	65.96	4.82
Ghod valley					
Chandoli	0.642	7.0	0.26	58.08	4.001
Hungsi valley					
Kupi	0.807	4.7	0.027	63.05	7.513
Kurnool caves					
Betamcherla	0.974	11.56	0.082	26.20	3.679

It was noticed that the fluorine/phosphate ratio was more significant than the fluorine content in different fossils. Fluorine method has limited application for distinguishing sub-phases within the short time-span, as the Chalcolithic period at Vagad, Runeja and at Inam-gaon. It gave best results when there were large time differences in two lots of bones in the same region. The Fluorine/phosphate ratio was 0.10 to 0.18 in the bone samples from Neo-lithic-Megalithic Gufkral while it was 5.07 in the Pleistocene fossil from Sombur in the same region. The latter value was lower than that of the early Quaternary beds at Pinjor (8.46).

Thus, in comparison with the fossils from Siwalik area this ratio for Sombur fossil was less and indicative of a later age than that of the Siwalik specimens. Fluroine/Phosphate ratio of fossils from Narmada and Hunsgi was more than that of the fossils recovered from Ghod and Manjara in the Godavari basin. This ratio for specimens from Kurnool caves near Betamcherla was less than that recovered from the Deccan river valleys. Thus, the chemical analysis of fossils was important in solving the chronological problems.

The conversion of hydrooxyapatite to fluorapatite was confirmed by the X-ray diffraction studies as the peaks of hydrooxyapatite were seen shifted to those of fluorapatite. There was variation in the calcium carbonate from Narmada and Siwalik accumulated less carbonates than those from Ghod, Godavari and Manjra. Heavy calcification was observed int he micro-sections and in the SEM studies. Calsite peaks were also noticed in the X-ray diffraction studies.

67. V.D. Gogte carried out a chemical analysis of various types of ancient pottery with view to classify. The ratio of ferric to ferrous state of iron alongwith the elemental carbon present in pottery was used to classify major types such as N.B.P. ware, P.G.W., B.S.W. and Malwa ware. The values of the ratio of ferric to ferrous and the elemental carbon present in the pottery reflected the technological aspect of the pottery making. The important conclusions were as follows:

1. N.B.P. ware was nothing but P.G.W. with black-polished-slip applied on its surface.

2. It was commonly thought that B.S.W. (Black Slip Ware) was a sort of intermediate ware step in the evolution of N.B.P. from P.G.W. However, the chemical analysis showed that there was no similarity between either N.B.P. ware or P.G.W. with B.S.W. as far as firing conditions were concerned.

3. The analysis showed that the percentage of carbon was more in slip than that in the core of N.B.P. ware. It also showed that the majority of iron present in the slip was in the form of ferrous silicate (86.05%) and magnetite (4.65%).

4. Further, it was possible to distinguish Malwa ware from Jorwe ware on the basis of Ferric to ferrous ratio in the potsherds.

The results are summarised in the following table.

Types of Pottery	Fe^{++}+ Fe^{+++} ratio	Carbon %
N.B.P. (Rajghat) slip	9.76	2.49
N.B.P. (Rajghat) core	1.82	1.39

Types of Pottery	Fe^{++}+ Fe^{+++} ratio	Carbon %
P.G.W. (Rupar)	1.88	0.61
P.G.W. (Jodhpura)	1.95	0.80
B.S.W. (Rupar)	0.59	3.08
B.S.W. (Jodhpura)	0.35	2.60
Malwa (Daimabad)	0.56	—
Jorwe (Daimabad)	0.13	—

The ratio Fe^{+}/Fe^{+++} was estimated for the potsherds fired at various temperatures to determine the range of firing temperatures during the Malwa and Jorwe periods at Inamgaon. The results showed that the firing temperature for Malwa was 500°C to 600°C and for Jorwe 600° C to 7 00° C.

68. The analysis of iron objects belonging to various sites namely Kausambi Tadakanhalli, Hulaskhera and Jajmau was done.

69. Copper objects belonging to Sringverpura were analysed and the analysis of objects from Hulas, Hulaskhera, Arni, Khapa and Mahurjhaxi are in progress.

70. A project regarding the conservation of birch bark was initiated. In this connection Lignin content, cellulose and copper number were determined.

71. Various studies were carried out regarding the use of anion-exchange resins for the removal of harmful salts from rusted iron objects.

72. The efficacy of various synthetic and natural inhibitors was tested in the presence of common pollutants like sulphur dioxide and hydrogen sulphide.

73. Studies pertaining to antifungal activity of birch bark were carried out. The relation of humidity and temperature for the growth of a fungus on birch bark (*A. niger*) was studied. The results indicated that on birch bark there is no fungal growth at 20°C and 52-100% R.H. upto 28 days. However, with increase in temperature the fungal growth advanced to 12 days at 30° C and at 35° C to 8 days.

Another project was regarding various types of fungi present on paper materials in the museums. Some fungi were collected from the State Museum, Lucknow.

74. Some special types of papers from Nepal, Lucknow, Calcutta and Ahmedabad were analysed to find out their utility in conservation of old and fragile documents, paintings, etc. These studies are continuing.

75. Samples were prepared from different starch sources and their properties like adhesion, flexibility and reversibility were studied. The adhesive paste prepared from the milk of wheat was found to be the best.

76. After successfully trying out a suitable TLC system for the identification of natural yellow dye-stuffs, further studies were taken up for red-dyes. It was observed that henna, manjistha, AI and lac dyes could be identified.

77. A systematic study of colourful bangles and beads was initiated to understand the technology of glass making and imparting colour to these specimens.

ARCHAEOLOGICAL GARDENS[1]

ANDHRA PRADESH

Inspite of difficulties of insufficient water supplied to the site the Hill Top garden at Nagarjunkonda was kept in a good condition. Extension of the pipe line in the second enclosure taken up last year was completed. Attractive gardens are being maintained around Amravati Museum in District Guntur and at Golkonda Fort, Hyderabad, although maintaining the water supply line is difficult.

BIHAR

The ancient Mauryan Palace Garden of Kumrahar, Patna, Shershah Tomb Garden, Sasa-ram and garden around the excavated remains and museum, Nalanda were well maintained throughout the year.

DELHI

In connection with the DC Asiad Games celebration ten small gardens were developed at Hauz Khas complex of Delhi in a short time and these gardens were brought under maintenance after development.

GUJARAT

A beautiful garden was maintained at Shahar-Ki-Masjid, Pavagarh throughout the year. The horticultural activities around Stepwell, Adalej, District Gandhinagar and Sun Temple Modhera, District Mahesana were initiated. The preliminary garden development activities were also carried out at Lothal Museum site and Jamia Masjid at Pavagarh. The irrigation facilities at the aforesaid sites are to be provided by boring tube wells.

GOA,DAMAN AND DIU

The facelifting of the garden around the church complex at Velha Goa was completed keeping in view the conference of the Heads of the Commonwealth Governments.

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[1] Information from Chief Horticulturist of the Survey which maintains nearly 90 Archaeological gardens. Important works carried out during the year under review are included here.

JAMMU AND KASHMIR

The gardens around Sun Temple, Martand, Pathar Masjid, Srinagar and Shankar Gouriesh-war Temple at Pattan were maintained. A 5 HP electric pump set was installed at Pattan garden. The sprinkler system of irrigation is nearing completion.

KARNATAKA

A group of gardens were beautifully maintained at Bijapur. Among these the spacious garden of Gol Gumbaj needs special mention. The worn out pipe lines were replaced with P.V.C. pipes. The gardens in Gumbaz-i-Shahi, Gumbaz in Mandya District and Dariya Daulat Bagh, Srirangapatna were properly maintained.

MAHARASHTRA

The garden in the famous mosque, Bibi-ka-Maqbara at Aurangabad was kept in a presentable condition even during acute shortage of water. The new proposal to take water from Thati Canal to the garden was initiated. The garden at Shanvarvada Fort in Pune was also kept in a presentable condition.

MADHYA PRADESH

The garden around the group of temples at Khajuraho, District Chattarpur was well maintained. The water supply system entrusted to C.P.W.D. authority was takenover and irrigation facilities were being extended to the eastern and southern group of temples. The garden attached to the Hamman and Fort garden at Burhanpur Fort, District Khandwa was satisfactorily maintained. The Madhya Pradesh lift irrigation Board has yet to complete the boring of tube well.

The renovation of water supply system was undertaken in the garden at Islam Nagar and pond, fountains and light arrangements were provided in the garden at Ranimahal, Bhopal, District Bhopal. New shrubs were introduced in the garden at Central Museum Indore. New plants were also introduced in the garden along with new arrangement for water supply at Chhatrasal Palace Museum, Dhubela, district Chhatarpur.

ORISSA

The garden around the famous temple of Lord Jagannath at Puri was kept in presentable condition by adding additional annual flower beds in the lawns. The other gardens at Bhu-baneswar such as at Rajarani temple, Mukteswar temple, Chittrakarani temple and Ramesh-war temple were also kept in presentable condition. The garden in the world famous Sun temple at Konark was also elegantly maintained. The work of landscaping the sand-dunes

around Konark temple (about 27 acres) is in progress.

RAJASTHAN

The gardens at Deeg Palaces in district Bharatpur, Anasagar Baradari, Ajmer and Chittor-garh Fort, Chittorgarh were properly maintained. The major work of development for landscaping at Chittorgarh Fort became possible after completion of the water supply scheme. About 400 acres of land was taken under development plan. The gardens in the Bhamashah palace, Victory tower, Vijaya Sthamb and extention around Padmini palace and Kumbha palace were under development. The development of garden in Bharatpur Fort was also reconsidered.

UTTAR PRADESH

The reorientation of Ram Bagh on Mughal style and the main work of paving of pathways in the ancient Mughal style and reconstruction of Fore-Court Wall as well as formation of orchard plots, etc. are in progress. The other gardens in monuments such as Taj Mahal, Akbar's Tomb at Sikandra, Etmad-ud-Daula, Agra Fort, Akbar's Palace at Fatehpur Sikri, Lord Corn-wallis' Tomb at Ghazipur, Ancient remains site and museum at Sarnath and Buddhist site at Kushinagar were kept in presentable condition. The garden in the ancient Roman Catholic Cemetery at Kanpur was also under development. Besides these sites, the garden branch is also maintaining three nurseries for propagating and supplying various types of plants needed in the archaeological gardens.

Extension of Horticultural activities

The ancient sites at Vaisali in Bihar, Saheth-Maheth in Uttar Pradesh, Dimapur in Naga-land, Harappan site at Lothal Mir-Abu-Murab tomb at Ahmedabad both in Gujarat, Farah Bagh at Ahmednagar in Maharastra, Cooch Bihar Palace and monuments at Malda in West Bengal and archaeological complex at Hampi in Karnataka were taken up for developing gardens.

PUBLICATIONS

Publications of the Survey

1. Indian Archaeology-A Review.- The issues for *1979-80, 1980-81* and *1981-82* were published.

2. Epigraphia Indica.- Volume XXXVII Part VIII, Part I, II of volume XXXIX were printed. Part III to V of volume XXXIX and parts I and II of Vol. XL were sent to the press.

Under the reprinting programme of the *Epigraphia Indica,* volumes XVI XVII, XVIII were reprinted. Volumes XIX, XX and *Appendix to Epigraphia Indica* volumes XIX-XXIII, popularly known as Bhandarkar's list are in the final stage of printing.

3. New Imperial Series.- Volume XL -Jai Singh observatory by Kay was reprinted.

4. Map of Monuments.— A map of monuments of National importance in Delhi was brought out.

5. Corpus Inscriptionum Indicarum.- The inscription of early Gupta was printed. This is a revised edtion of volume III of the series.

6. Guide Books.- *Archaeological Museum, Sanchi* (second Edition) by Narinder Nath and J.P. Saxena; *Delhi and Its Neighbourhood* (3rd edition) by Y.D. Sharma; *Dig* (Third Edition) by M.C. Joshi; *Kushinagara* (second edition) by D.R. Patil; *Mandu* (Hindi version) translated by Ravinder Narang; *Sarnath* (Hindi), (Second Edition) by V.S. Agrawala; *Sravasti* (Second Edition) by M. Venkataramayya and *Taj Museum* by Z.A. Desai and H.K. Kaul have been printed.

Other Publications

Madhya Pradesh.— The Department of Archaeology and Museums, Madhya Pradesh released the following publications; *Malwa Through the Ages,* edited by M.D. Khare; *Printed Rock Shelters,* edited by M.D. Khare.

Orissa.— The *Annual Archaeological Survey Report,* Vol. I dealing with the sites explored, surveyed and excavated have been compiled and published by the Department of Archaeology, Orissa State.

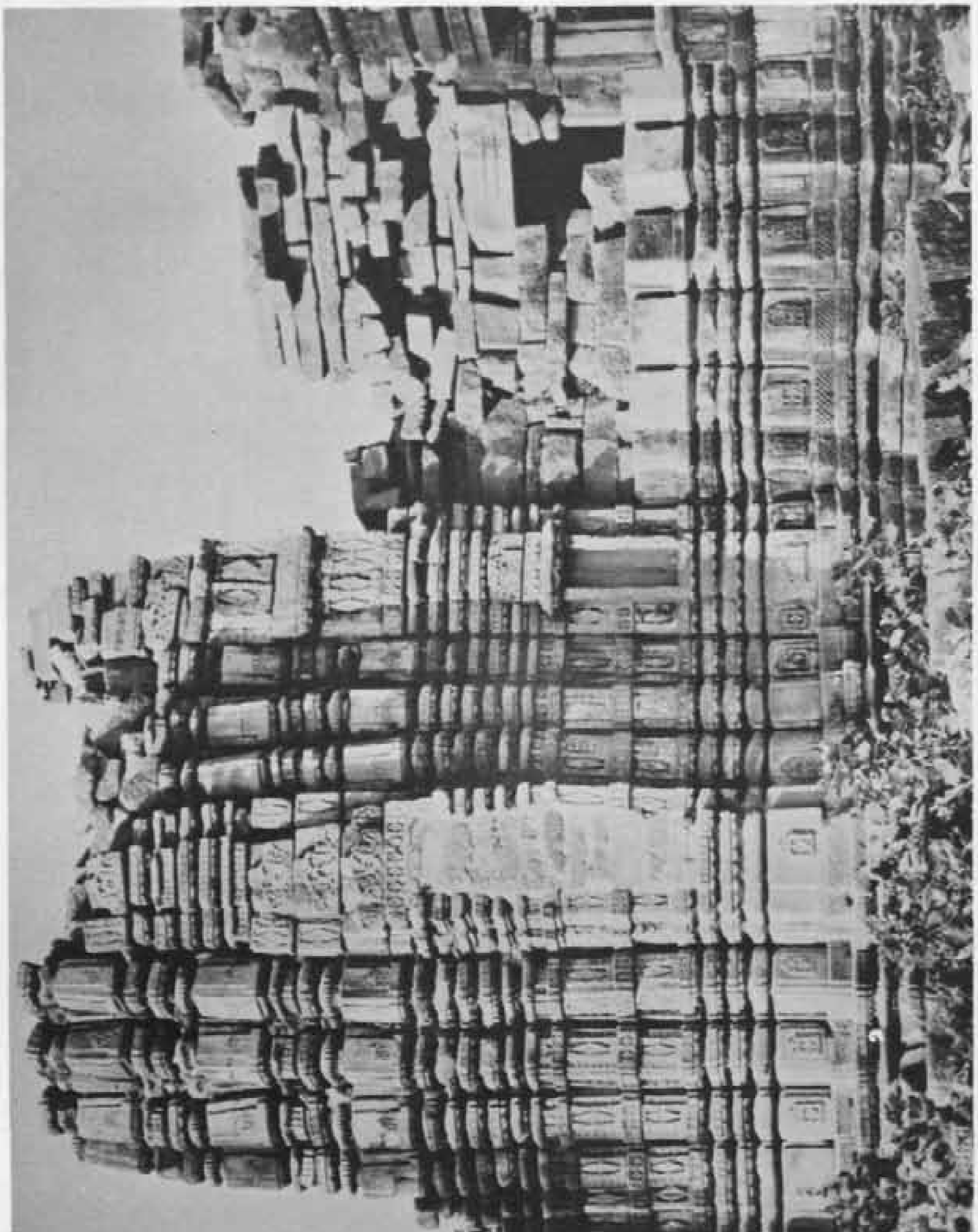
Mathura Museum, Mathura.— The *catalogue of Seals and Sealings* of *Mathura Museum,* prepared by T.P. Verma of Banaras Hindu University has been published. The catalogue describes 145 Seals and Sealings of the Museum collection. Almost all are illustrated. Three attractive folders were also issued by the Museum on the occasion of the Golden Jubilee Celebration of its new building.



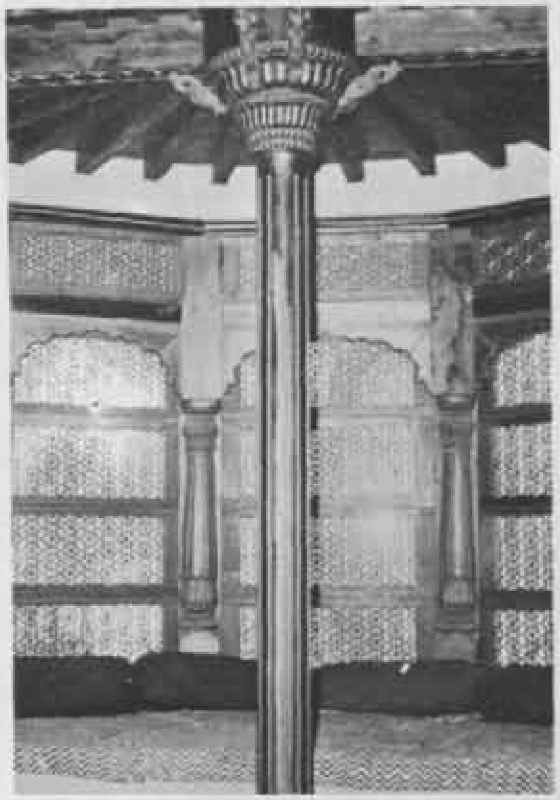
102. Srirangapatna copper coins (obverse & reverse).



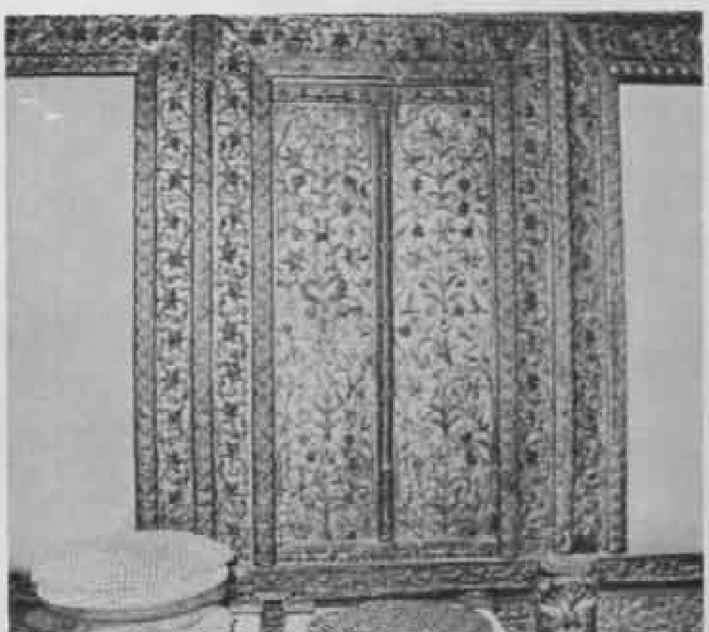
103. Nachha Kuthara Chaturmukha Mahadeo temple.



104. Mahoba Sun temple.



105. Hasol haveli of Gautam Sarabhai.



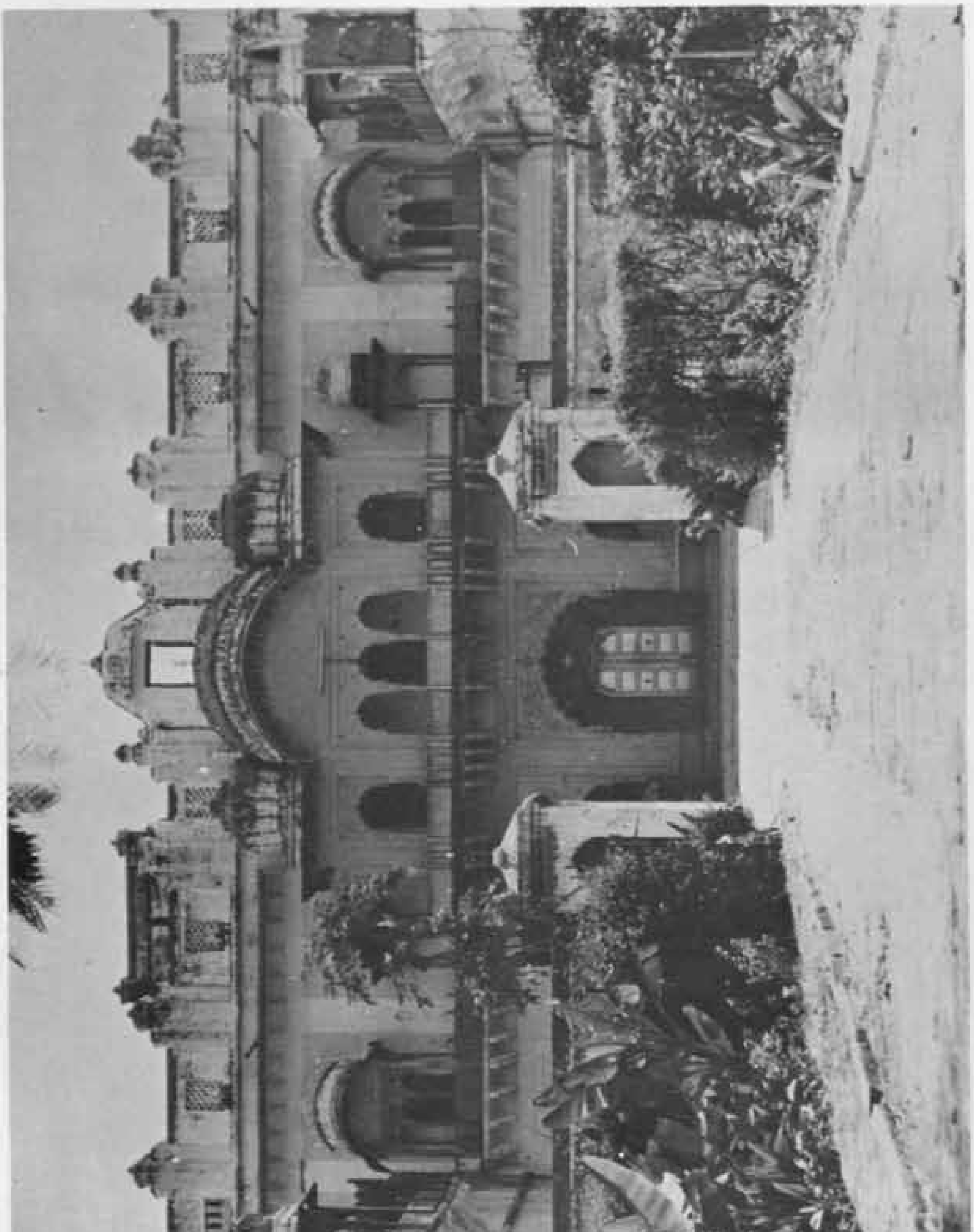
106. Hasol Wooden almirah with painted carvings.



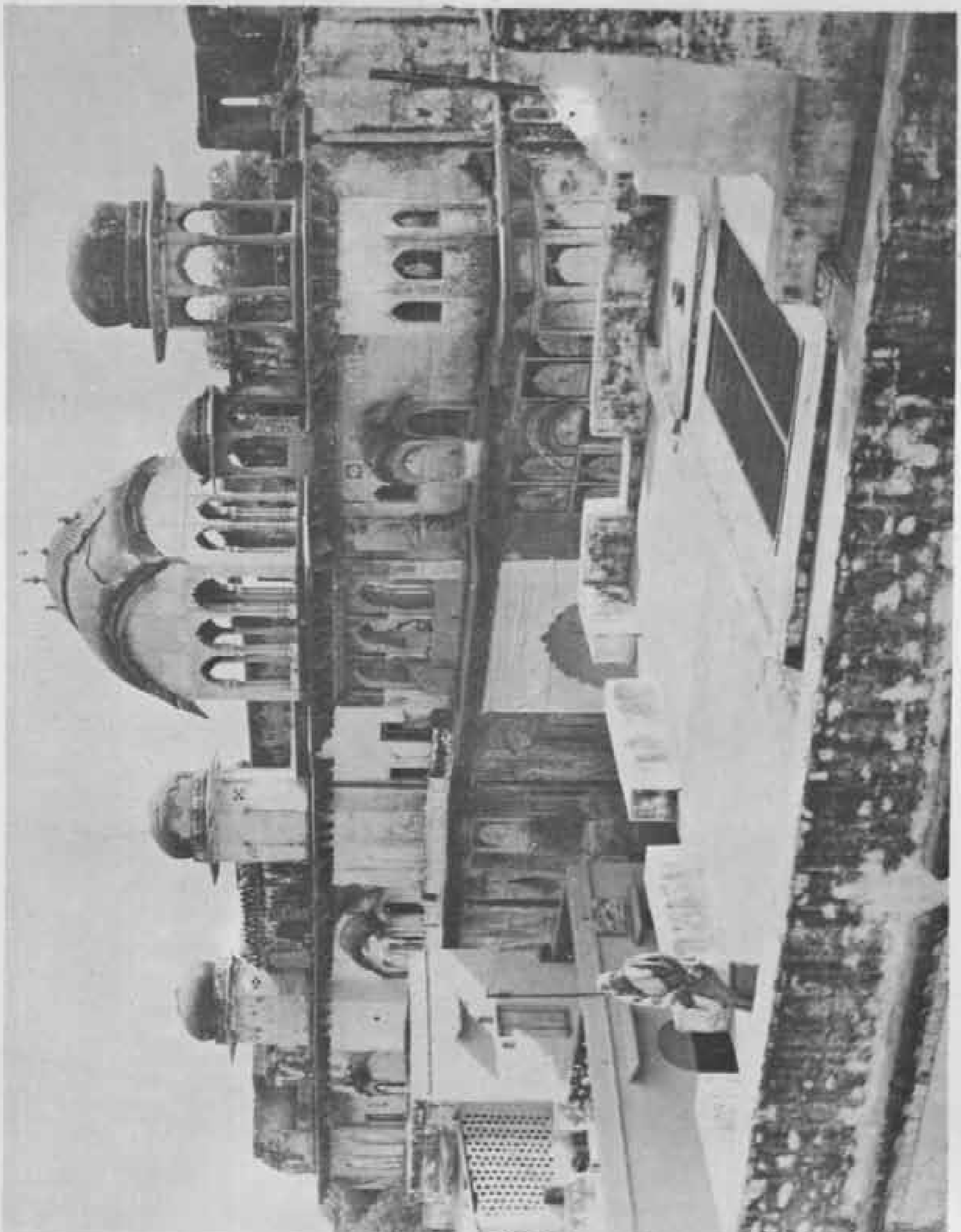
107. Bhadra residence of Babi khan.



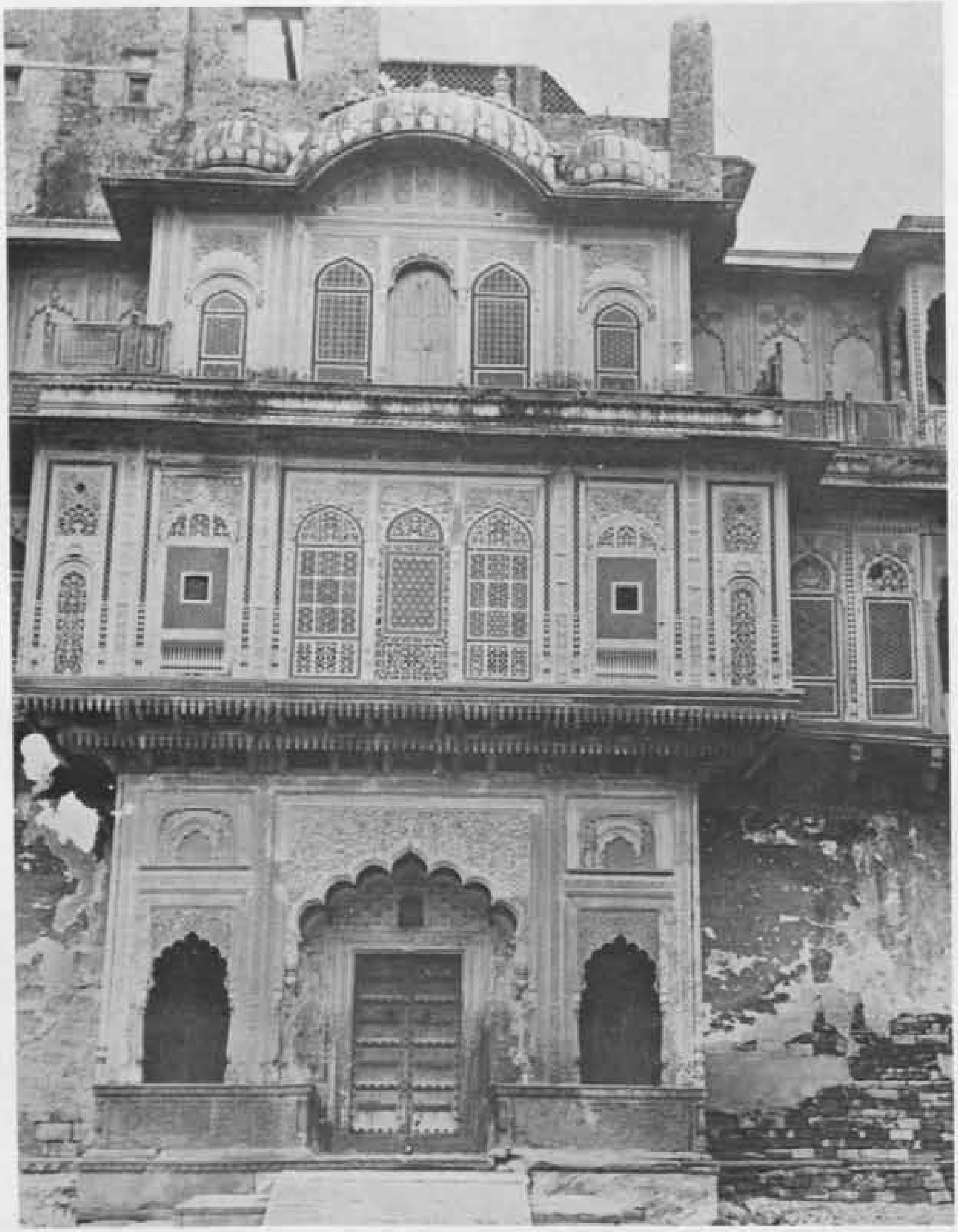
108. Bhadra Nazar Bagh palace.



109. Bharatpur haveli of kakaji.



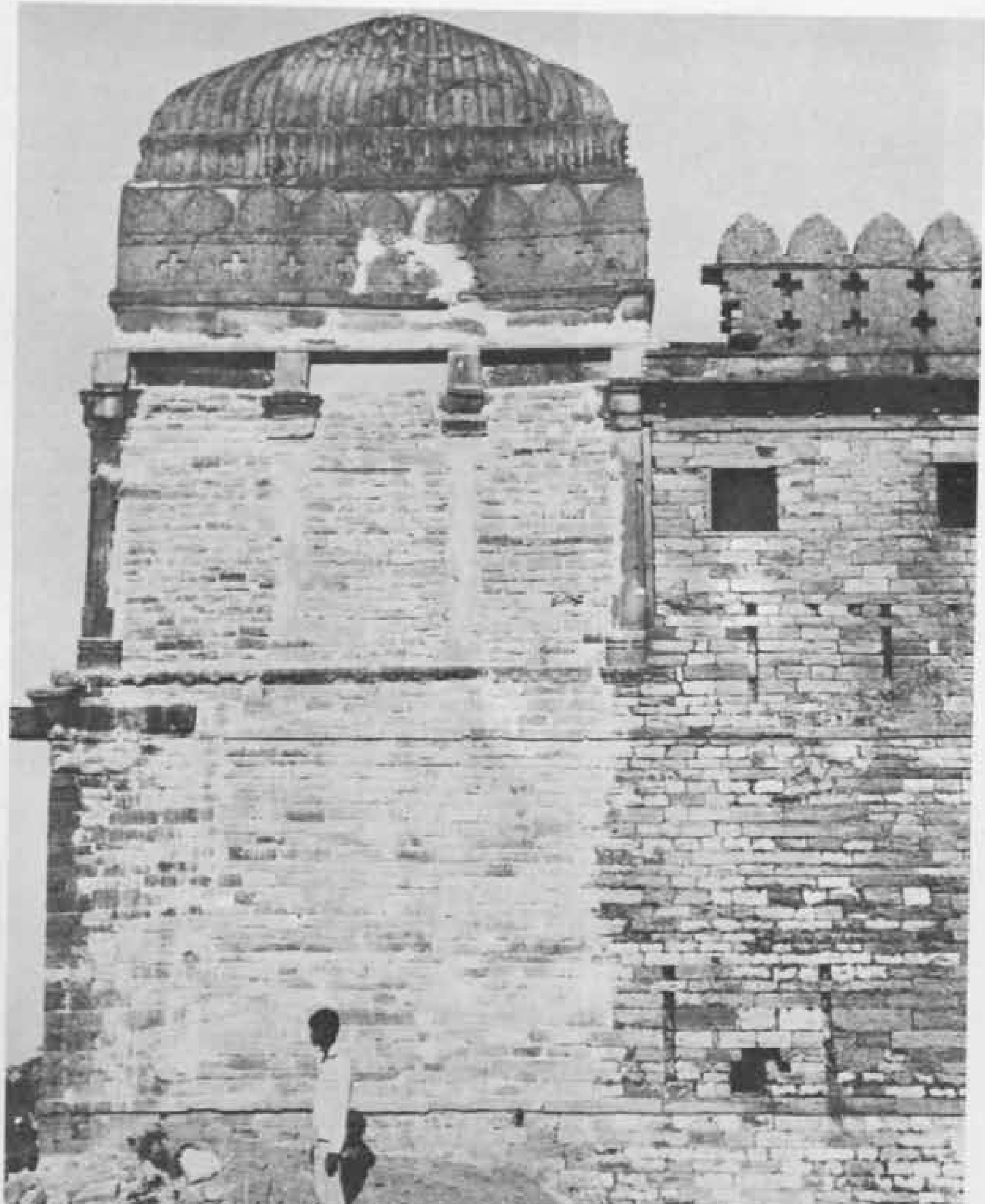
110. Bharatpur haveli of Madan Lal and C, Agra: Lalaki.



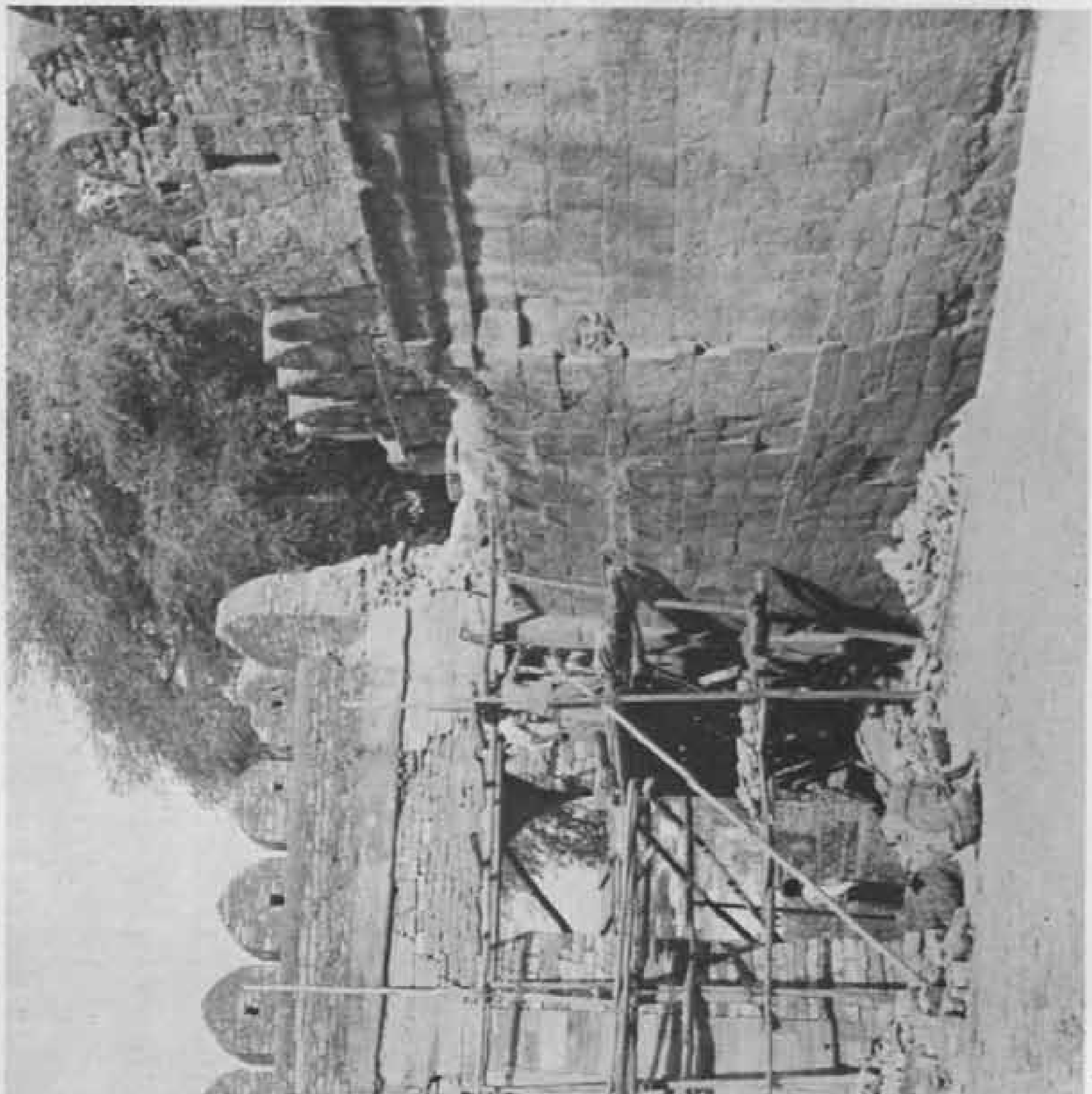
111. Bharatpur havēli.



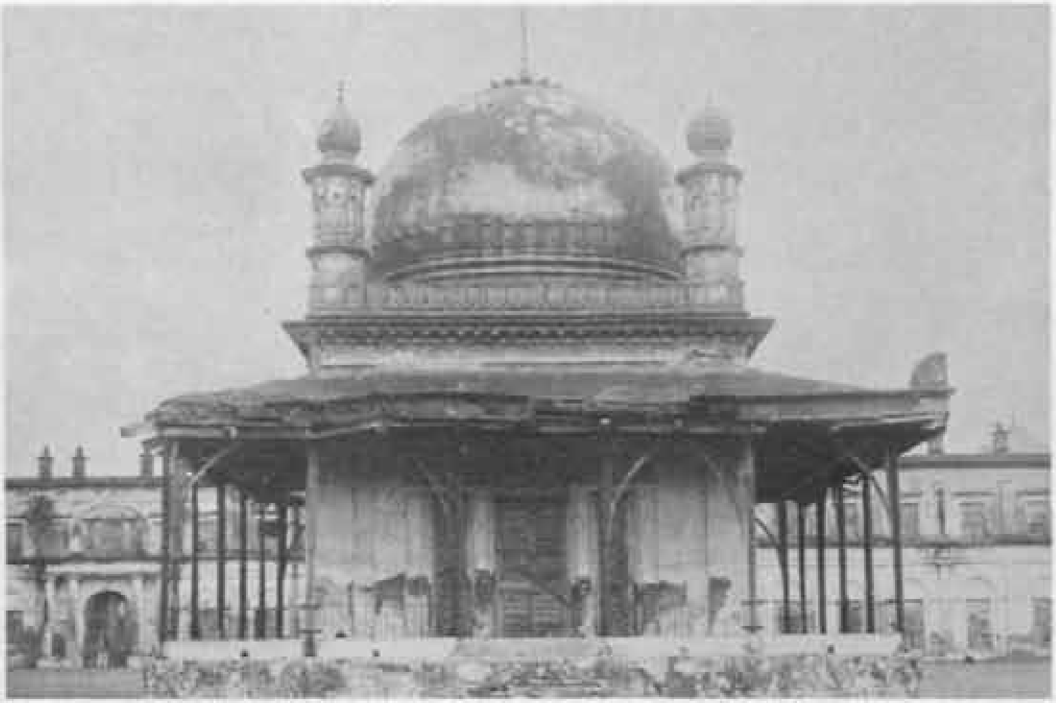
112 Chanderi Fort during conservation of Palace corner.



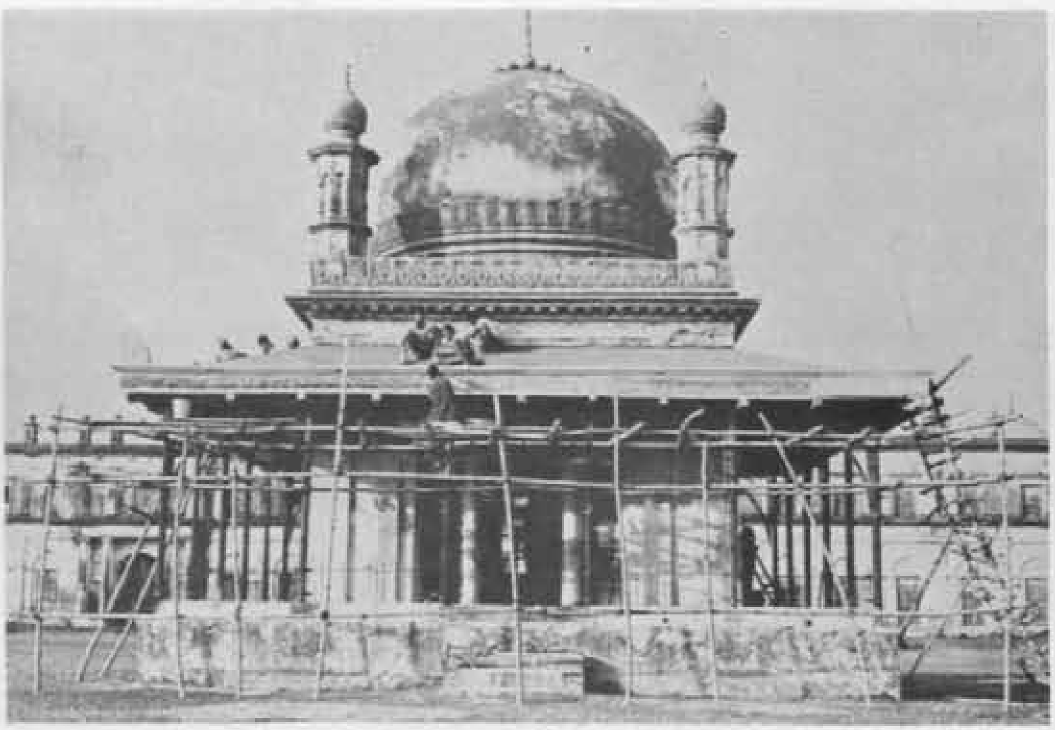
113 Chanderi Fort after conservation of Palace corner.



114 Gwalior Fort during conservation of Ganesa Gate.



115 Murshidabad, Hazar-duari Palace before conservation of Madina Mosque.



116 Murshidabad, Hazar-duari Palace during conservation of Madina Mosque.



117 Katra Mosque before conservation of the dome of Musafirkhana.



118 Katra Mosque after conservation of the dome of Musafirkhana.



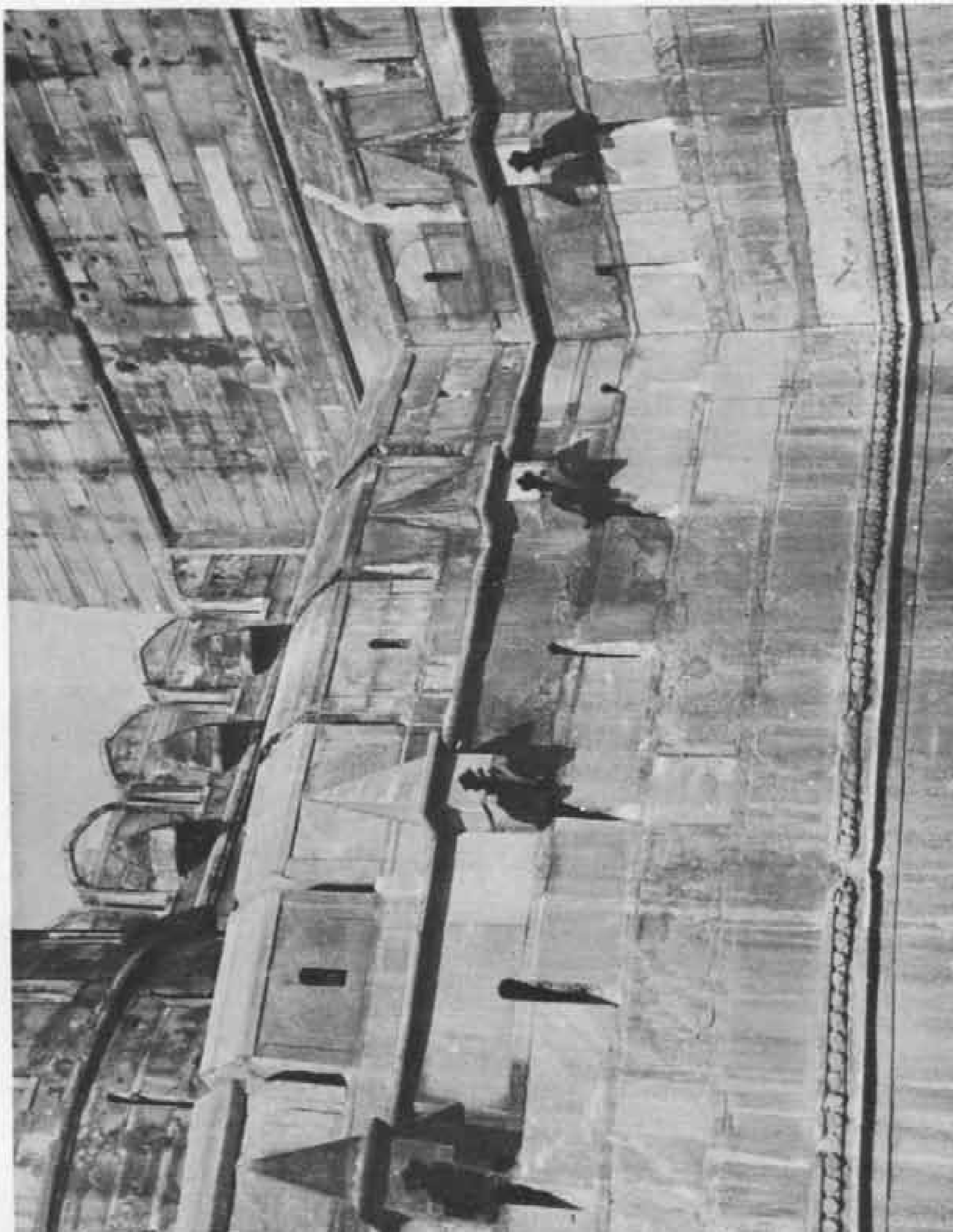
119 Kausambi before conservation of monastic remains.



120 Kausambi after conservation of monastic remains.



121 Agra Fort, Amar Singh Gate before conservation of south eastern fortification Wall.



122 Agra Fort, Amar Singh Gate after conservation of south eastern fortification Wall.



123 Agra, Sikandra before repairs of compound Wall.



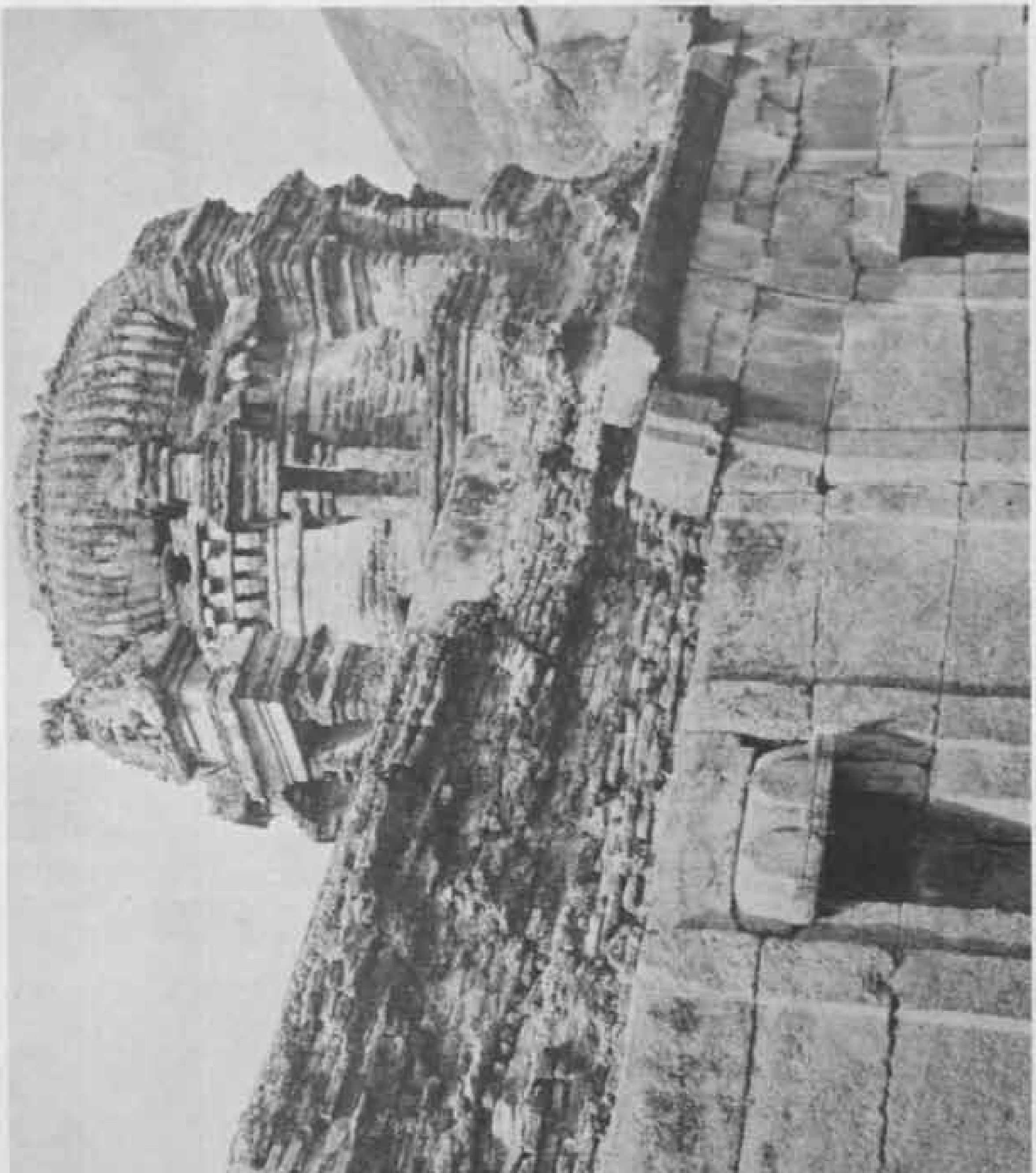
124 Agra, Sikandra after repairs of compound Wall.



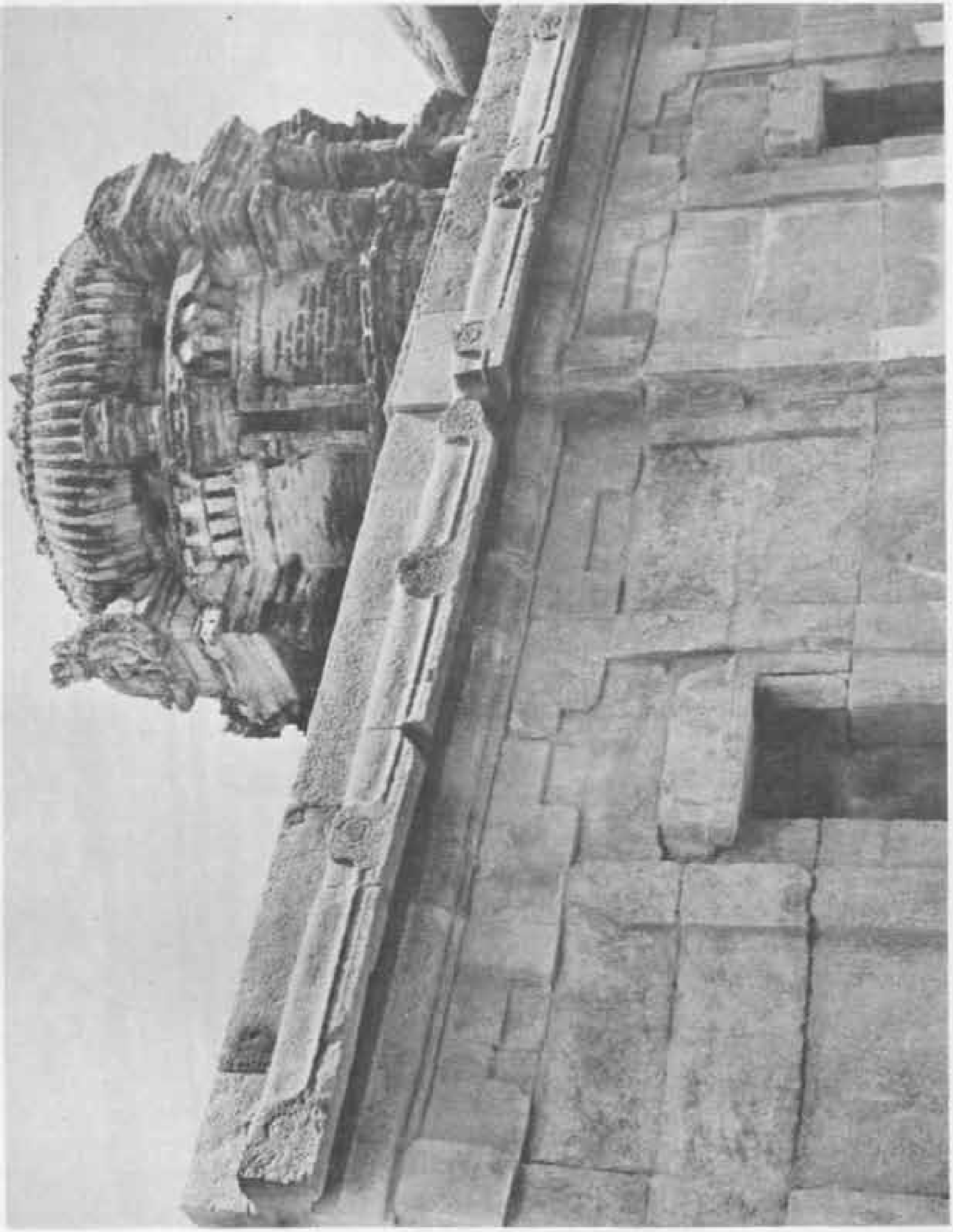
125 Nattery; Chandramualisvara temple before conservation of the northern Gopura.



126 Nattery; Chandramualisvara temple after conservation of the northern Gopura.



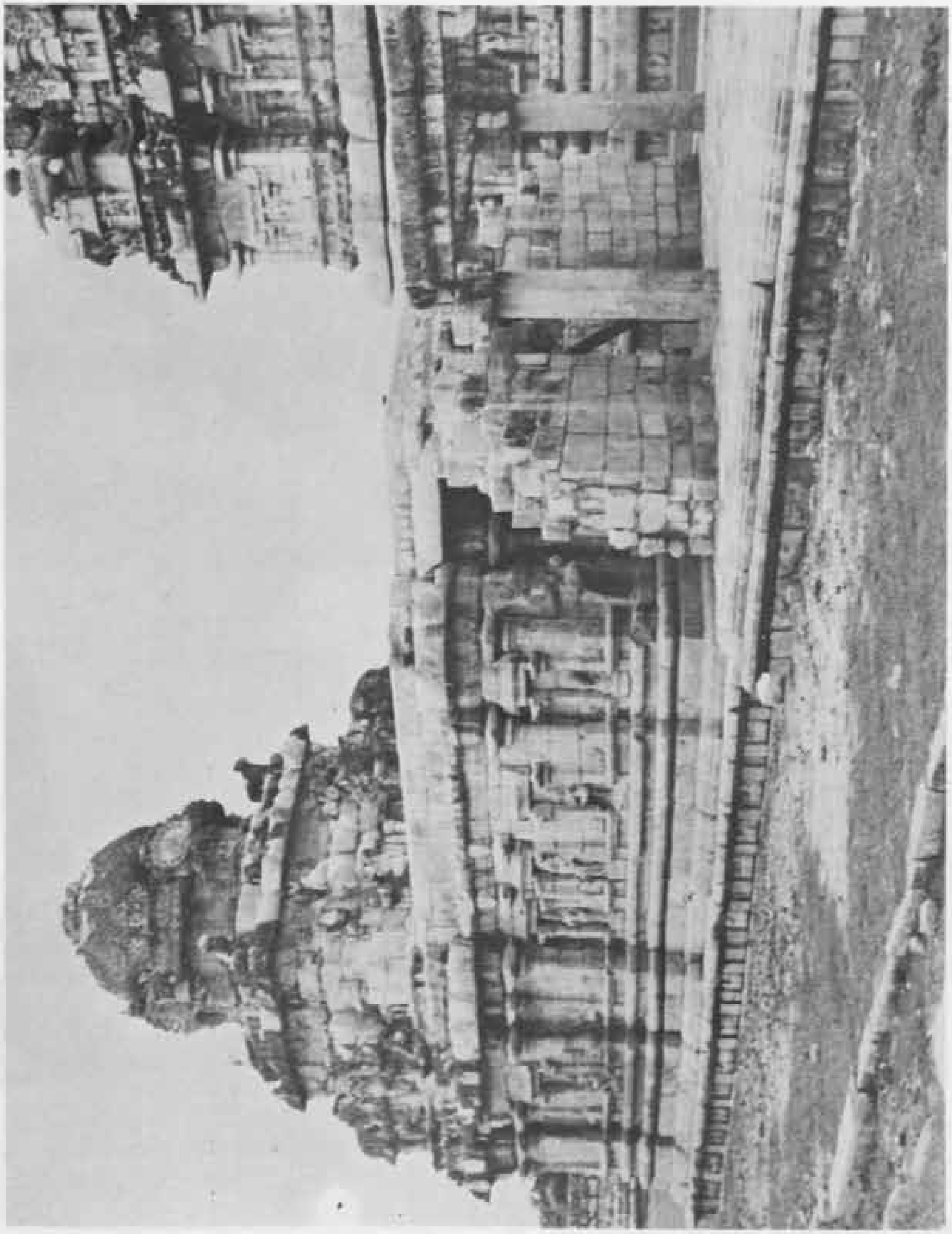
127 Siyamangalam, Amman shrine before conservation of rock-cut cave temple.



128 Siyamangalam, Amman shrine after conservation of rock-cut cave temple.



129 Gangaikonda Cholapuram, Tenkailasanatha temple inside Brihadisvara temple complex before conservation of Mahamandapa.



130 Gangaikonda Cholapuram, Tenkailasanatha temple inside Brihadisvara temple complex after conservation of Mahamandapa.



131 Mughal Sarai Shambhu before conservation chemical treatment.



132 Mughal Sarai Shambhu after conservation chemical treatment.



133 Archaeological Museum, Goa paintings before chemical treatment.



134 Archaeological Museum, Goa Paintings after chemical treatment.



135 Archaeological Museum, Goa Paintings before chemical treatment.



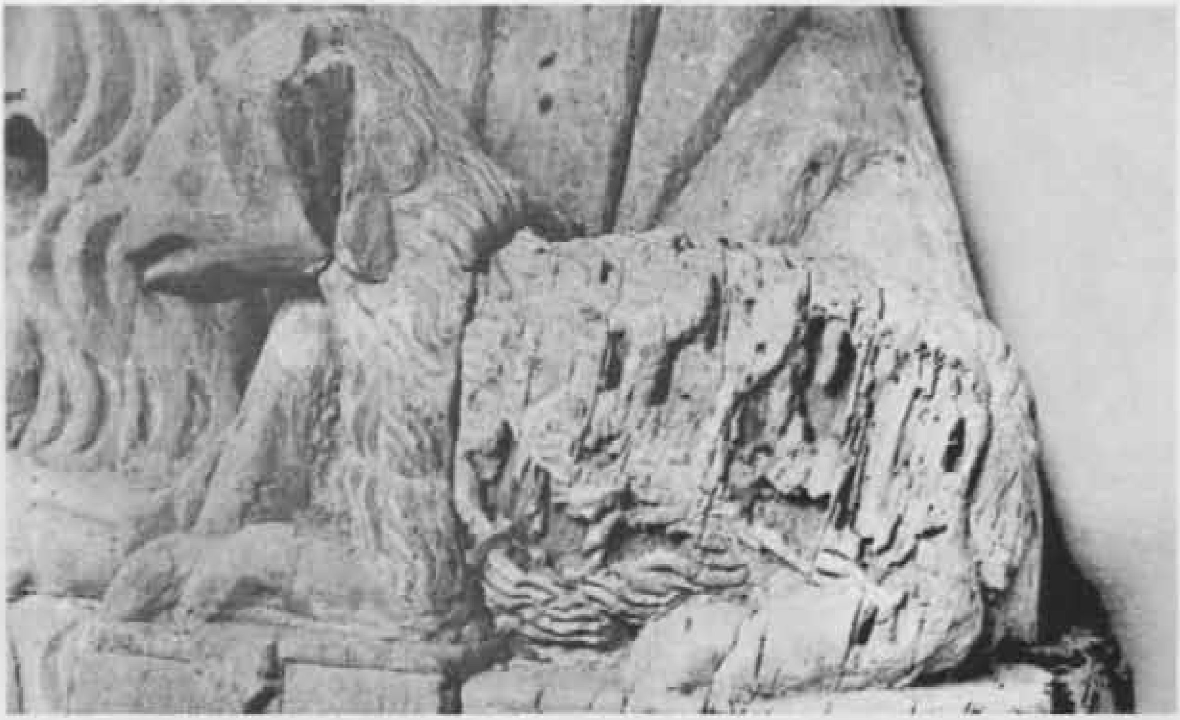
136 Archaeological Museum, Goa Paintings after chemical treatment.



137 Archaeological Museum, Goa Painting before chemical treatment.



138 Archaeological Museum, Goa Paintings after chemical treatment.



139 Archaeological Museum, Goa polychrome structure before chemical treatment.



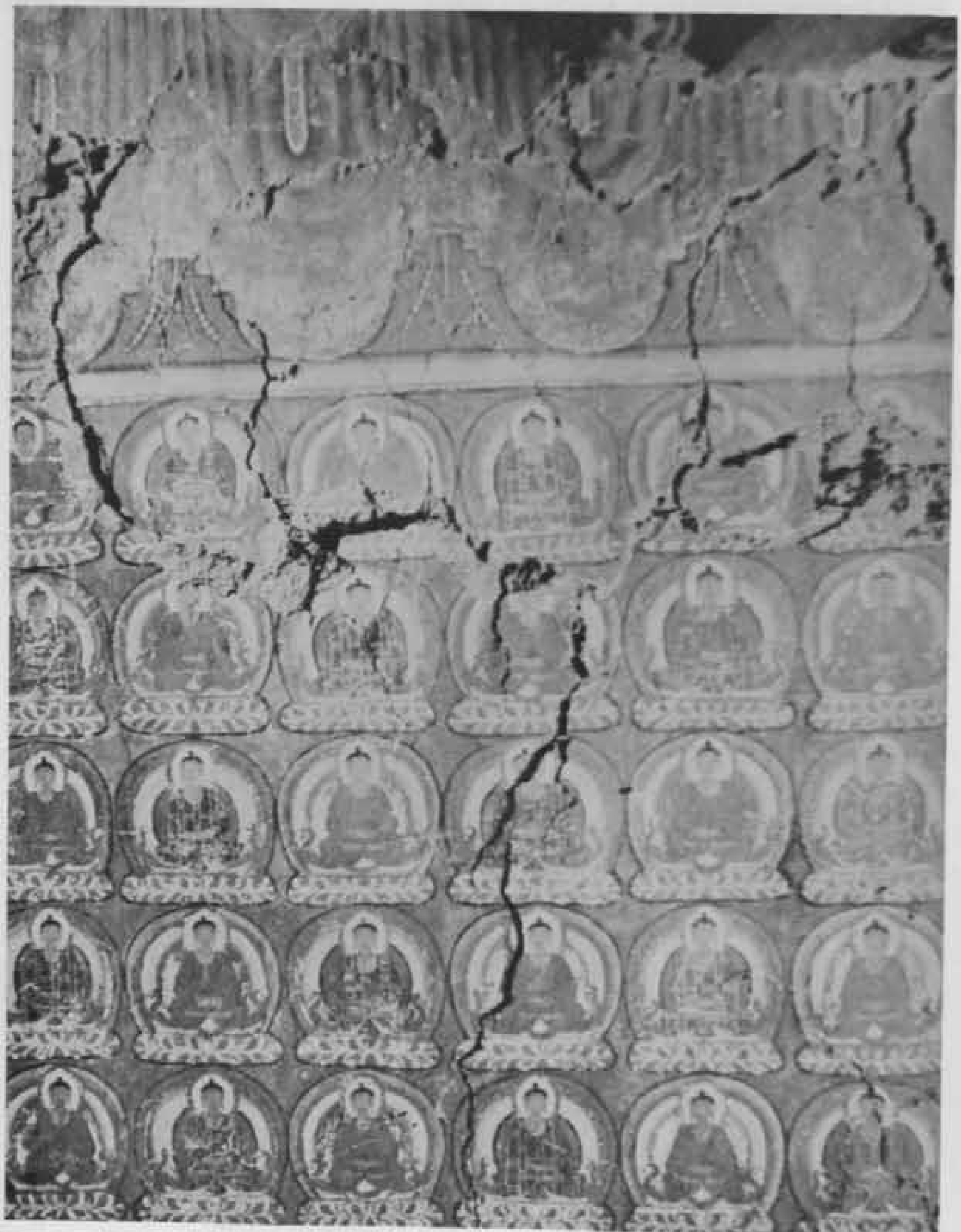
140 Archaeological Museum, Goa polychrome structure after chemical treatment.



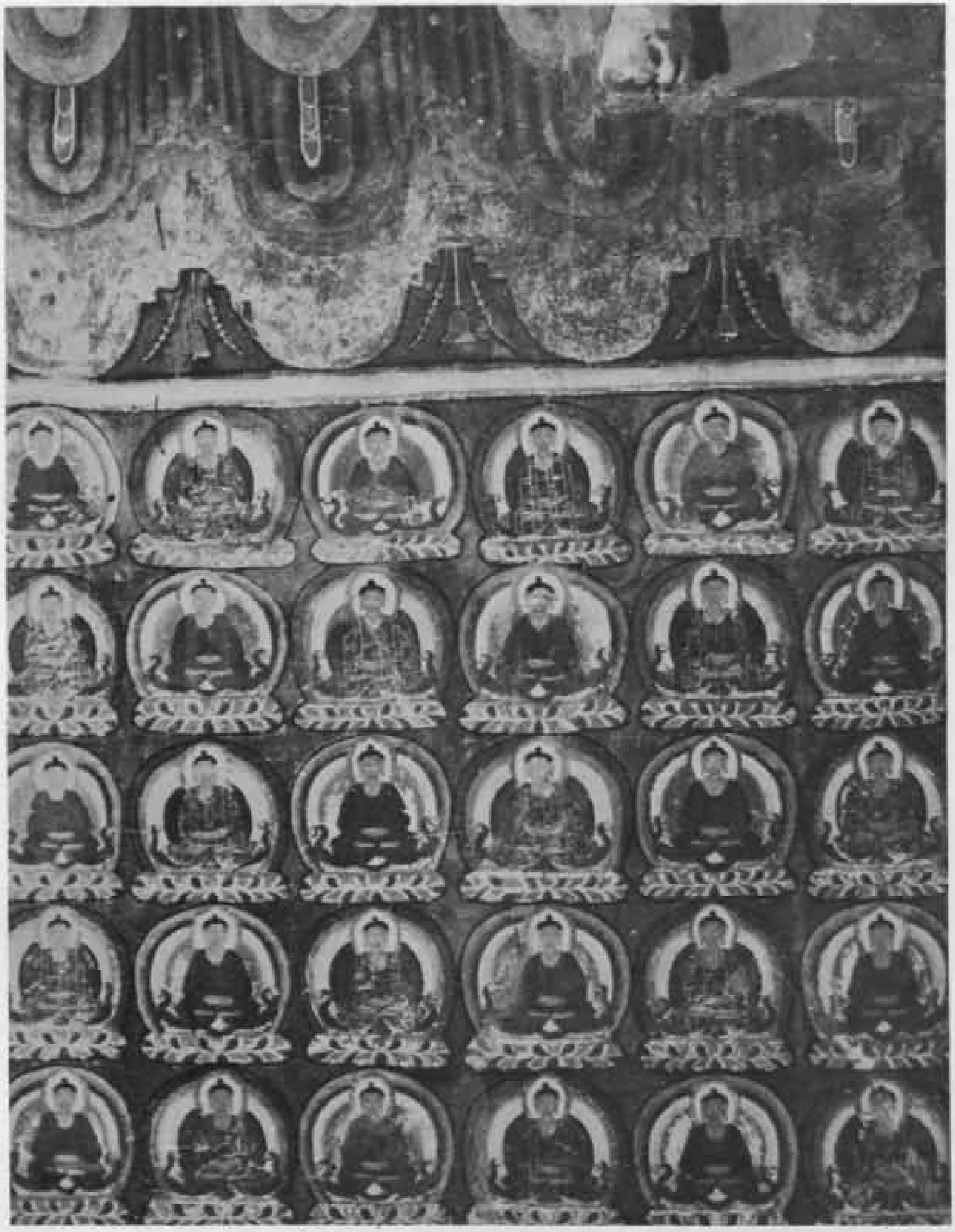
141 Tabo, Chamba Chibbo wall painting before chemical treatment.



142 Tabo, Chamba Chibbo wall painting after chemical treatment.



143 Alchi, Sumtsek monastery painting on a wall before chemical treatment,



144 Alchi, Sumtsek monastery painting on a wall after chemical treatment.



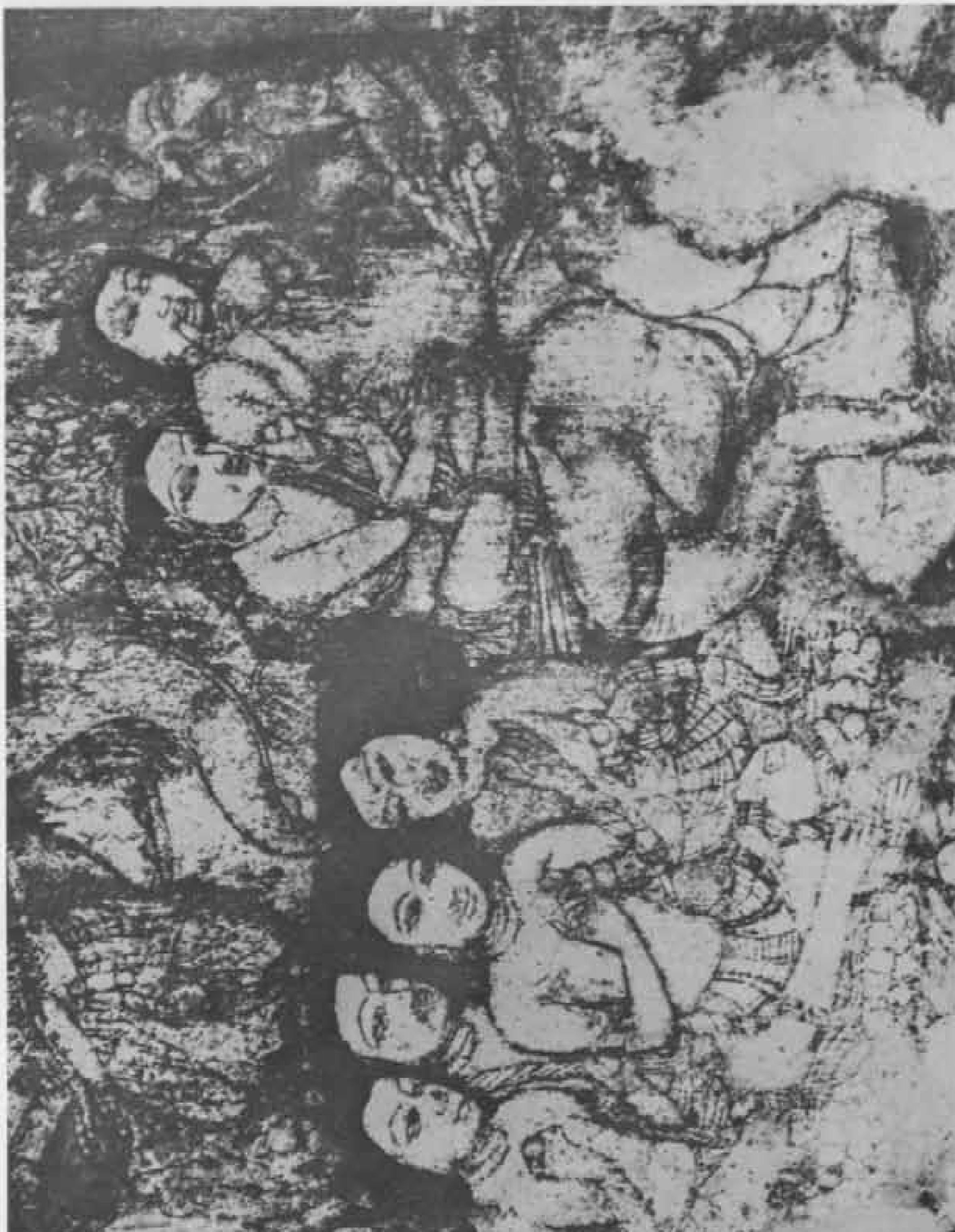
145 Alchi, Sumtsek monastery painting on a wall before the chemical treatment.



146 Alchi, Sumtsek monastery painting on a wall after the chemical treatment.



147 Ajanta Cave 17, Panel No. 11 before the chemical treatment.



148 Ajanta Cave 17, Panel No. 11 after the chemical treatment.



149 Ajanta Cave 17, panel No. 9 and 10 before chemical treatment.



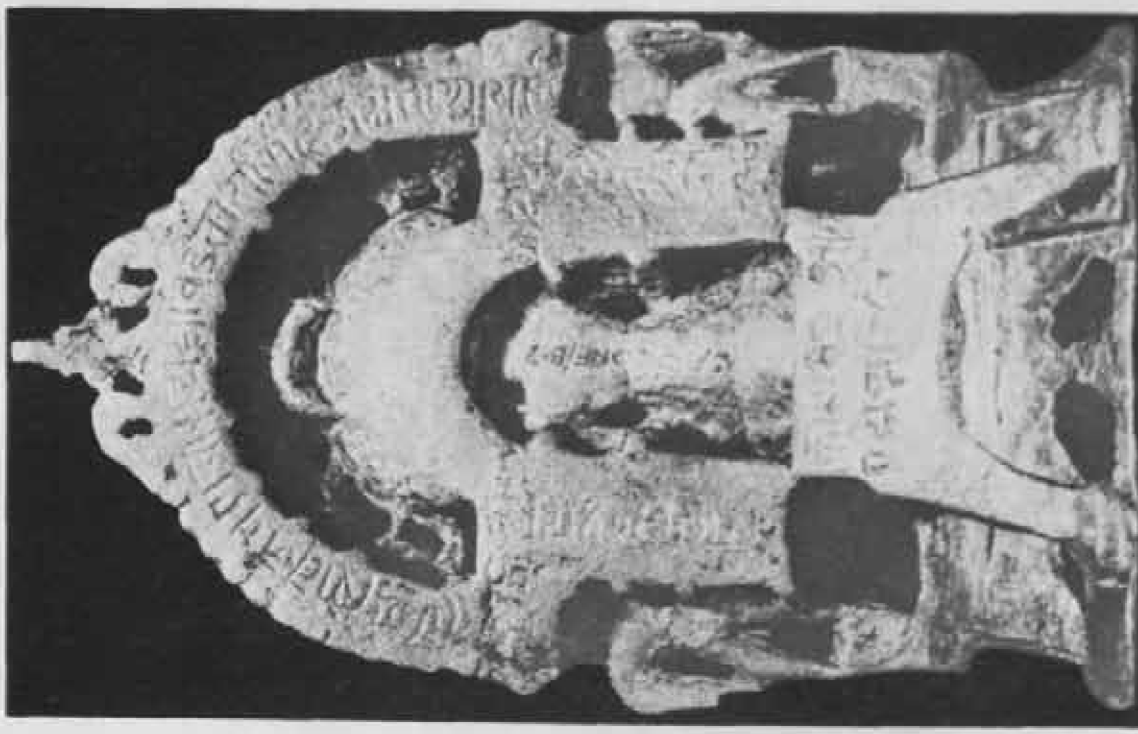
150 Ajanta Cave 17, panel No. 9 and 10 after chemical treatment.



151 Sopara, bronze image of Parshvanath before chemical treatment (obverse and reverse views).



152 Sopara, bronze image of Parshvanath after chemical treatment (obverse and reverse views).



154 Sopara, bronze image of Parshvanath after chemical treatment (obverse and reverse views).



153 Sopara, bronze image of Parshvanath before chemical treatment (obverse and reverse views).